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सत्यमेव जयते
Government of India

NVBDCP

Operational Manual for Malaria Elimination in India

Operational Manual for Malaria Elimination in India 2016

(Version 1)

Government of India

Directorate of
National Vector Borne Disease Control Programme
Directorate General of Health Services
Ministry of Health & Family Welfare
Government of India

Disclaimer

This document is not a formal publication.

This document is printed as “Version 1” and will be updated in line with international guidelines presently under revision.

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Dr. Jagdish Prasad
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FOREWORD

The Directorate of National Vector Borne Disease Control Programme (NVBDCP) has embarked upon the bold mission of eliminating malaria from the country in a phased manner by 2027 and sustaining zero indigenous cases and deaths due to malaria up to 2030 and beyond, in line with the regional and global targets. The National Framework for Malaria Elimination in India 2016- 2030, launched by Honourable Health and Family Welfare Minister, Shri J. P. Nadda in February, 2016 has laid out the vision, mission, broad principles and practices to achieve this target. The principles and practices will vary according to the epidemiological situation of malaria in different states and UTs for which the entire country has been divided into 4 categories: Category 3 (Intensified Control Phase), Category 2 (Pre-elimination Phase), Category 1 (Elimination Phase) and Category 0 (Prevention of Re-introduction Phase).

The states and UTs of the country are now required taking forward the malaria elimination agenda by implementing category-specific interventions. For this purpose, the Directorate of NVBDCP has developed an '***Operational Manual for Malaria Elimination in India'*** to assist the states and UTs in transitioning from malaria control to malaria elimination programme. This Manual provides comprehensive guidelines for stratification, surveillance, diagnosis, case management, vector control, capacity building, health system strengthening, IEC/BCC, community mobilization, research, advocacy and inter-sectoral coordination as well as other key programmatic areas. The states and UTs need to align their respective programmes in accordance with these guidelines and ensure their successful and uniform implementation.

Past attempts at eliminating malaria from the country in the form of the National Malaria Eradication Programme (NMEP) of 1958, met with limited success and malaria continued to pose a challenge to the health and quality of life of vast population. With the launch of India's malaria elimination initiative, the states and UTs have a remarkable opportunity to get rid of this disease and contribute to better health and socio-economic development especially amongst the country's most vulnerable populations. I strongly believe that the guidelines in this Manual will facilitate to change the elimination vision into a reality. I whole-heartedly endorse this important document and call upon the various stakeholders to adopt this Manual and make malaria elimination a success.

Jprasad

(Dr. Jagdish Prasad)

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FOREWORD

I congratulate the Dte. of National Vector Borne Disease Control Programme (NVBDCP) for developing an Operational Manual for Malaria Elimination in India for guidance to stakeholders after the successful launch of the National Framework for Malaria Elimination 2016-2030 in February 2016.

As partner of the NVBDCP, Caritas India remains committed to support the NVBDCP efforts through the pathway to malaria elimination by sharing responsibilities especially to reach out to the poor and vulnerable population in hard to reach areas with timely service delivery and intensify community knowledge, awareness and organization and mobilization. Caritas India strongly believes that the partnerships have been and continue to be a catalyzing factor to make difference and shape the malaria landscape in the times ahead in India, towards alleviation of suffering, saving lives and contribution to overall development.

Fr. Frederick D' Souza
Executive Director
Caritas India

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PREFACE

The ***Operational Manual for Malaria Elimination in India 2016*** has been developed by the Directorate of National Vector borne Disease Control Programme (NVBDCP). The purpose of the manual is to provide guidelines to the programme personnel involved in malaria elimination agenda, including medical and para medical personnel, to implement the National Framework for Malaria Elimination in India launched in February 2016.

The operational manual is an outcome of several brainstorming sessions with experts from various premium institutions and organizations. Important topics identified and deliberated during the sessions and also observed by the programme personnel have been addressed in the manual.

The manual provides overall guidelines, which may be adapted as per context and requirements by states and UTs. Such guidelines are subject to continuous evolution with the changes in policy & strategy and will be updated from time to time.

With commitment for realizing the vision of malaria elimination in the country, the NVBDCP together with states & UTs and other stakeholders would contribute to improved health, quality of life and alleviation of poverty.

A Dhariwal
23/4/2016
(Dr. A. C. Dhariwal)

ACKNOWLEDGEMENTS

The Directorate of NVBDCP conveys its sincere thanks to the Ministry of Health & Family Welfare, Government of India for continued support to develop this operational manual. We are indebted to Prof. (Dr.) Jagdish Prasad, DGHS, for his valuable technical guidance. We appreciate the constant patronage and encouragement given by Dr. A. C. Dhariwal, Director NVBDCP, in developing the manual.

The operational manual is an outcome of collective effort of NVBDCP officers - Dr. Avdhesh Kumar, Additional Director, Dr. P. K. Srivastava, Joint Director, Dr. Sukhvir Singh, Joint Director, Dr. Suman Lata Wattal, Deputy Director and Dr. Sher Singh, Deputy Director; and consultants - Dr Amrish Gupta, Dr. Disha Agarwal, Dr. Saloni Mehra, Dr Pritam Roy and Dr Munish Joshi. The manual has been finalized with the indefatigable efforts of Dr A. Gunasekar, Independent Consultant under the guidance of Dr. G. S. Sonal, Additional Director, and overall charge and coordination of Dr. S. N. Sharma, Joint Director, NVBDCP. Valuable inputs were also received from Dr Nupur Roy, Additional Director, Dr. R. K. Dasgupta, Joint Director, Dr. Kalpana Barua, Joint Director and consultants - Mr. Sanjay Gupta, Mr. Zakir Hussain and Mr. Harish, NVBDCP.

We are grateful to WHO-SEARO and WHO India Country Office for providing technical and financial support for the development of the operational manual. We thank all stakeholders who provided their valuable inputs and suggestions during the various consultations held for developing the operational manual, with special mention of Caritas India and National Institute of Malaria Research. We acknowledge and value the immense contribution made by Dr. Shampa Nag, Project Director from Caritas India and Dr. K. Raghavendra, Scientist F from National Institute of Malaria Research.

ABBREVIATIONS

ABER	Annual blood examination rate
ACD	Active case detection
ACT	Artemisinin-based combination therapy
AIM	Action and Investment to defeat Malaria
API	Annual parasite incidence
API	Association of Physicians of India
ASHA	Accredited social health activist
AWW	Anganwadi worker
BCC	Behaviour change communication
BMO	Block medical officer
bw	Body weight
CBO	Community based organisation
CMO	Chief medical officer
DDT	Dichloro-diphenyl-trichloroethane
DGHS	Directorate General of Health Services
DHS	Director of Health Services
DVBDCO	District Vector Borne Disease Control Officer
EAC	Externally aided component
EMP	Environmental management plan
FAC	Final acceptance certificate
FBO	Faith-based organisation
FEFO	First expiry first out
GAAP	Governance and accountability action plan
GFATM	Global fund to fight against AIDS, Tuberculosis and Malaria
GoI	Government of India
GRAN	Goods receipt and acceptance note
GTS	Global Technical Strategy
HMIS	Health management information system
IAP	Indian Academy of Pediatrics
ICMR	Indian Council of Medical Research
IEC	Information, education and communication
IDSP	Integrated Disease Surveillance Programme
IMA	Indian Medical Association
IMCP	Intensified Malaria Control Project
IRS	Indoor residual spray
ITN	Insecticide treated bed net
JMM	Joint Monitoring Mission
LLIN	Long-lasting insecticidal net
LQAS	Lot quality assurance sampling
MBER	Monthly blood examination rate
MDG	Millennium Development Goals
MO	Medical Officer

MoH&FW	Ministry of Health & Family Welfare
MPHW	Multipurpose health worker
NGO	Non-governmental organization
NHP	National health policy
NRHM	National Rural Health Mission
NHM	National Health Mission
NIMR	National Institute of Malaria Research
NMCP	National malaria control programme
NRL	National reference laboratory
NVBDCP	National vector borne disease control programme
malERA	Malaria Eradication Research Agenda
MIS	Management Information System
Pf	*Plasmodium falciparum*
PCD	Passive case detection
PCR	Polymerase chain reaction
PHC	Primary health centre
PIP	Program implementation plan
PPE	Personal protective equipment
PPP	Public private partnership
Pv	*Plasmodium vivax*
RDK	Rapid diagnostic kit
RDT	Rapid diagnostic test
SC	Subcentre
SDG	Sustainable Development Goals
SHG	Self-help group
SHS	State health society
SOE	Statement of expenditure
SOP	Standard operating procedure
SPO	State programme officer
SRL	State reference laboratory
SSLT	Sentinel site laboratory technician
SSMO	Sentinel site medical officer
TES	Therapeutic efficacy studies
TOR	Terms of reference
TPP	Target Prooduct Profile
UC	Utilization certificate
UNEP	United Nations Environment Programme
UT	Union territories
VBD	Vector borne disease
VBDCP	Vector Borne Disease Control Programme
VCP	Vulnerable communities plan
WCO	WHO country office
WHO	World Health Organization
ZMO	Zonal malaria office

GLOSSARY[1]

Annual blood examination rate. The number of examinations for malaria by slides for microscopy or RDT per 100 population per year.

Autochthonous (locally transmitted) case. A case locally acquired by mosquito-borne transmission. Locally acquired cases can be indigenous, introduced or relapsing.

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

Case investigation. Collection of information to allow classification of a malaria case by origin of infection, i.e. whether it was imported, introduced, indigenous, induced or relapsing. Case investigation may include administration of a standardized questionnaire to a person in whom a malaria infection is diagnosed, as well as screening and testing of people living in the same household or surrounding areas.

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

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

Certification of malaria-free status. Certification granted by WHO after it has been proofed beyond reasonable doubt that local human malaria transmission by Anopheles mosquitoes has been interrupted in an entire country for at least 3 consecutive years and a national surveillance system and a program for the prevention of reintroduction is in place.

Confirmed malaria case. Malaria case (or infection) in which the parasite has been detected by a diagnostic test, i.e. microscopy, rapid diagnostic test, or molecular diagnostic test.

Cross-border malaria. Malaria transmission associated with the movement of individuals or mosquitoes across borders.

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

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

[1] Source: World Health Organization.

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

Focus. A defined and circumscribed area in a currently or former malarious area that contains the epidemiologic and ecological factors necessary for malaria transmission. Foci can be classified as endemic, residual active, residual non-active, cleared up, new potential, new active or pseudo focus.

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

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

Incubation period. The period between inoculation of malaria parasites and onset of clinical symptoms.

Indigenous case. A case contracted locally with no evidence of being imported or being directly linked to transmission from an imported case. It includes delayed first attacks of *P. vivax* malaria due to locally acquired infection followed by a long incubation period.

Induced case. A case whose origin 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.

Intervention (public health). Activity undertaken to prevent or reduce the occurrence of a health condition in a population. Example 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 malaria.

Introduced case. 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).

Malaria elimination. Interruption of local transmission (reduction to zero incidence) of human malaria parasites in a defined geographical area as a result of deliberate efforts. Continued measures to prevent re-establishment of transmission are required.

Malaria 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.

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 defined period of time in a specified population.

Malaria prevalence. Proportion of the population with malaria infection at one point in time in a specified population (also known as parasite prevalence).

Population at risk. Population living in a geographical area where locally acquired malaria cases occurred in the past three years.

Presumed malaria case. Suspected malaria case not confirmed by a diagnostic test but nevertheless diagnosed as malaria. The diagnosis is reserved for those situations where a diagnostic test cannot be performed in a timely manner.

Rapid diagnostic test. Immuno-chromatographic lateral flow devices for the rapid detection of malaria parasite antigens. It may be a stick, cassette or card test in which a coloured line indicates the presence of the plasmodial antigen.

Rapid diagnostic test positivity rate. Proportion of positive results among all rapid diagnostic tests performed.

Receptivity. Ability of an ecosystem to allow transmission of malaria. The ecosystem required presence of competent anopheline vectors, suitable climate, susceptible population, etc.

Re-establishment of transmission. Renewed presence of a measurable incidence of locally acquired malaria infection due to repeated cycles of mosquito-borne infections in an area in which the transmission had been interrupted. A minimum 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 focus, for two consecutive years for *P. falciparum* and for three consecutive years for *P. vivax*.

Relapse. Recurrence of asexual parasitaemia in *P. vivax* or *P. ovale* infections. Relapse occurs when blood-stage infection has been eliminated but hypnozoites persist in liver and mature to form hepatic schizonts, which after an interval (generally, three weeks to one year), rupture and release asexual parasites (merozoites) into the bloodstream.

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

Slide (Test) positivity rate. Proportion of blood smears (including Rapid Diagnostic Tests) found to be positive among all slides examined (and all Rapid Diagnostic tests done).

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. Surveillance can be carried out at different levels of the health care system (e.g. health facility-based, community-based), and using different detection systems (e.g. case-based, active, passive), and sampling strategies (e.g. sentinel sites, surveys).

Surveillance (elimination programmes). That part of the programme designed for the identification, investigation and elimination of continuing transmission, the prevention and cure of infections and final substantiation of claimed elimination.

Suspected malaria case. Illness suspected by a health worker to be due to malaria, after ruling out other obvious causes of fever.

Transmission intensity. The frequency with which people living in an area are bitten by anopheline mosquitoes carrying human malaria sporozoites. It is often expressed as the annual entomological inoculation rate (EIR), which is the average number of inoculations with malaria parasites estimated to be received by one person by time period. Due to the difficulty in measuring EIR, parasite rate in young children is often used as a proxy for transmission intensity.

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. An imprecise way of ranking vector species or populations as relatively more or less important in transmission. It is less calculable than vectorial capacity.

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 the population is and remains fully susceptible. Factors affecting vectorial capacity include: (i) density of female anophelines relative to humans; (ii) their longevity, frequency of feeding and propensity to bite humans; and (iii) length of the parasite extrinsic cycle.

Vigilance. A function of the public health services aimed at preventing re-introduction of malaria. It consists of close monitoring for any occurrence of malaria in receptive areas where transmission has been interrupted, and application of the necessary measures to prevent the re-establishment of transmission.

Vulnerability. The frequency of influx of infected individuals or groups and/or infective anophelines into an area. Also referred to as importation risk.

1. Introduction

1.1 Demography and Health Indicators

India is the world's biggest democracy, the second most populous country with over 1.2 billion people and the seventh largest by area. It is a federal constitutional republic governed under a parliamentary system consisting of 29 States and 7 union territories. The country is further sub-divided into 640 districts, 5,924 sub-districts, 7,933 towns and 640,930 villages[2]. The landscape of India is widely varied with vast plains, expansive deserts, thick forests, tall mountain ranges and also two groups of islands. The population is also extremely diverse comprising various religions, ethnic groups amongst others.

Despite being one of the world's fastest growing economies, India continues to face challenges of poverty and poor health. Though the country's health-related indicators have improved since the launch of National Rural Health Mission (NRHM) in 2005, much still remains to be achieved, for example, the infant mortality rate is still very high at 40 per 1000 live births (2013), the under-5 mortality rate is 49 per 1000 live births (2013) and maternal mortality ratio is 167 per 100,000 live births (2011-13).[3]

1.2 History of Malaria Control in India

Historically, in the early 1900s, malaria control operations in India were centred on anti-larval operations, mainly in tea gardens, railways and military areas. In the 1930s, pyrethrum was introduced as space spray and in 1940s, the effectiveness of DDT in malaria control was documented in several trials. At the time of India's independence in 1947, about 22% of the country's 344 million population was estimated to suffer from malaria with 75 million cases and 0.8 million deaths resulting annually.

To combat the devastating effects of malaria, the National Malaria Control Programme (NMCP) was launched in 1953 built around three key activities - insecticidal residual spray (IRS) with DDT; monitoring and surveillance of cases; and treatment of patients. NMCP's activities rapidly brought down malaria related morbidity and mortality in India within a few years. Encouraged by the programme's resounding success and following fears that anopheles mosquitoes were developing resistance to DDT, the NMCP was converted to National Malaria Eradication Programme (NMEP) in 1958. The NMEP achieved further success and by 1965, the reported malaria incidence in India had sharply declined to a mere 0.1 million cases with zero deaths. At that time, focal outbreaks started occurring and increased in later years which could not be contained due to technical and operational challenges. Besides, the infrastructure in general health services was not adequate to take up surveillance and vigilance. This led to the

[2] Census 2011, Registrar General of India, Government of India
[3] Sample Registration System data

resurgence of malaria in many parts of the country. Added to this was the problem of malaria in urban areas. The Madhok Committee (1969) was constituted to make recommendations for actions to be taken and the urban malaria scheme was launched in 1971 with the focus on antilarval measures in urban areas.

By 1976, there was a massive resurgence of malaria with 6.46 million cases reported attributed to poor health infrastructure and sub-optimal monitoring and logistics in many parts of the country. In addition, *P.falciparum* resistance to chloroquine and vector resistance to insecticides were also reported. As a consequence, 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. The malaria incidence showed a decline again and in 1984 the cases were reduced to about 2 million with 247 deaths.

In order 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) launched with support of The Global Fund to fight AIDS, Tuberculosis and Malaria (GFATM) in 2005.

The malaria control programme was integrated into the National Vector Borne Disease Control Programme (NVBDCP) in 2002. New tools for malaria prevention and control were introduced under NVBDCP i.e., monovalent RDTs for *P. falciparum* detection in 2005; ACT in 2006; LLINs in 2009; antigen detecting bi-valent RDTs for detection of both *P. falciparum* and *P. vivax* in 2013; and newer insecticides and larvicides in 2014-15.

The milestones in the India's malaria control programme are listed in Table 1.1.

Table 1.1 Milestones in malaria control programme in India

1947	75 million cases and 0.8 million deaths estimated to be due to malaria
1953	National Malaria Control Programme (NMCP) launched
1958	National Malaria Eradication Programme (NMEP) launched
1965	Malaria cases reduced to 0.1 million
Early 1970's	Resurgence of malaria in some towns and cities
1971	Urban Malaria Scheme launched
1976	Malaria cases rose to 6.46 million, highest since mid-1950s
1977	Modified Plan of Operation (MPO) implemented
1984 to 1998	Annual incidence of malaria reduced to 2-3 million cases
1995	Modified Action Plan for malaria control implemented
1997	World Bank assisted Enhanced Malaria Control Project launched
1999	NMCP renamed as National Anti-Malaria Programme (NAMP)
2002	Integration of malaria control programme into the NVBDCP
2005	Global fund (Round 4) assisted intensified malaria control project

	(IMCP) launched; Monovalent RDTs introduced in the programme
2006	ACT introduced in areas with chloroquine resistance in *P. falciparum*
2008	ACT introduced in *P. falciparum* predominant districts; World Bank assisted National Vector Borne Disease Control Support Project launched
2009	LLINs introduced; Oral artemisinin monotherapy banned
2010	Malaria drug policy revised with extending ACT use for all *P. falciparum* cases; Global Fund (Round 9) assisted IMCP–II launched
2013	Bivalent RDTs introduced in programme; ACT-AL started in NE States
2014-15	Newer insecticides and larvicides introduced
2016	National Framework for Malaria Elimination in India launched

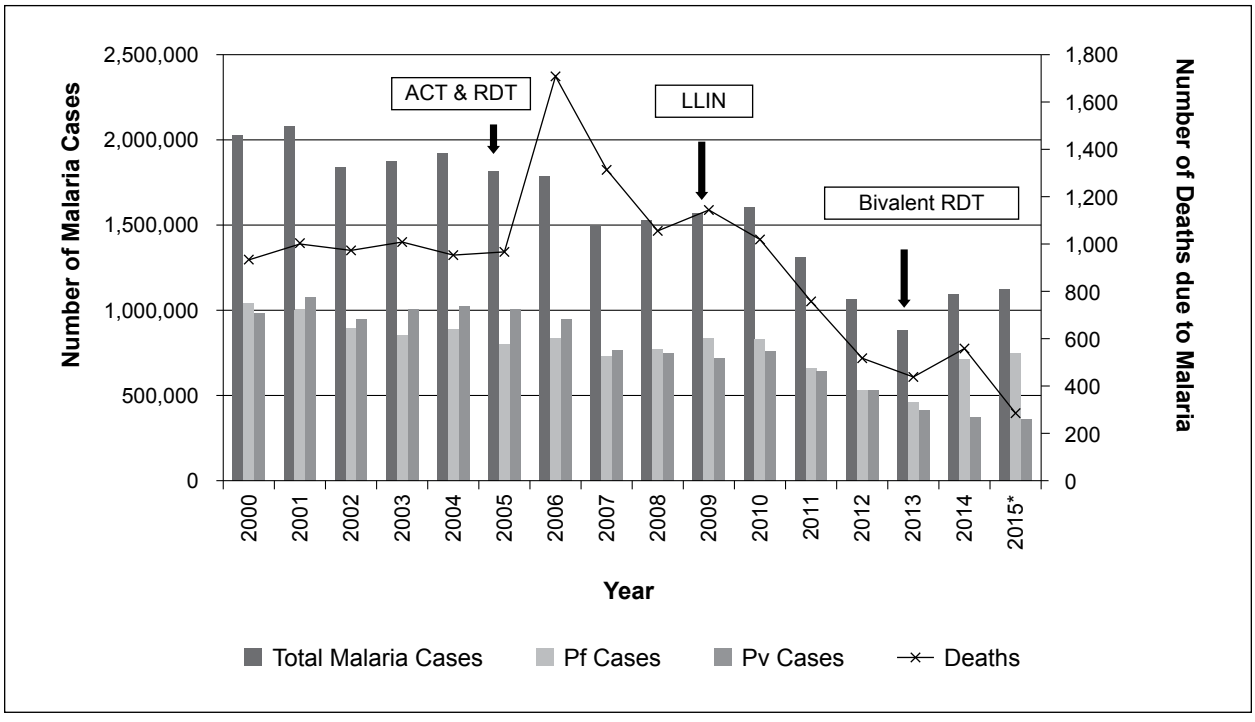
1.3 Recent Trends in Malaria

The malaria incidence and deaths due to malaria have reduced significantly in recent years. During the period 2000 to 2015, cases declined by 44% from 2.03 million to 1.13 million and deaths declined by 69% from 932 to 287. The *Pf* percentage remained around 50% from 2000 to 2013, but rose to 65.6% in 2014 and 67.1% in 2015, contributed by increased *Pf* detection by widespread use of RDTs by trained ASHAs. The malaria epidemiological data and trends during 2000 to 2015 is given in table 1.2 and figure 1.1 respectively.

Table 1.2 Malaria epidemiological data, India (2000-2015)

Year	Blood examinations (in millions)	Positive Cases (in millions)	*Pf* %	ABER	API	SPR / TPR	Deaths
2000	86.79	2.03	51.5	8.9	2.1	2.3	932
2001	90.39	2.09	48.2	9.2	2.1	2.3	1,005
2002	91.62	1.84	48.7	9.0	1.8	2.0	973
2003	99.14	1.87	45.9	9.7	1.8	1.9	1,006
2004	97.11	1.92	46.5	9.3	1.8	2.0	949
2005	104.14	1.82	44.3	9.6	1.7	1.7	963
2006	106.73	1.79	47.1	10.0	1.7	1.7	1,707
2007	94.93	1.51	49.1	8.7	1.4	1.6	1,311
2008	97.32	1.53	50.8	8.7	1.4	1.6	1,055
2009	103.40	1.56	53.7	9.0	1.4	1.5	1,144
2010	108.68	1.60	52.2	9.3	1.4	1.5	1,018
2011	108.97	1.31	50.3	8.9	1.1	1.2	754
2012	109.03	1.07	50.0	9.0	0.9	1.0	519
2013	113.11	0.88	52.6	9.3	0.7	0.8	440
2014	124.07	1.10	65.6	10.1	0.9	0.9	562
2015(P)	118.47	1.13	67.1	9.6	0.9	0.7	287

Figure 1.1: Malaria trends (2000-2015[4])



[4] 2015 data - Provisional

2. National Framework for Malaria Elimination in India 2016-2030: Overview

Encouraged by the success achieved in malaria control in recent years, the vision of India's malaria control programme has been now shifted to sustained malaria elimination to contribute more effectively to improved health and quality of life of the people. The National Framework for malaria elimination in India 2016-2030 was launched in February 2016.

2.1 Vision

Eliminate malaria nationally and contribute to improved health, quality of life and alleviation of poverty.

2.2 Goals

In line with the WHO Global Technical Strategy (GTS) for Malaria 2016–2030 and the Asia Pacific Leaders Malaria Alliance Malaria Elimination Roadmap, the goals of the National Framework for Malaria Elimination in India 2016–2030 are:

- Eliminate malaria (zero indigenous cases) throughout the entire country by 2030; and
- Maintain malaria–free status in areas where malaria transmission has been interrupted and prevent re-introduction of malaria.

2.3 Objectives

The National framework for malaria elimination in India has formulated the following objectives:

- By 2022, transmission of malaria interrupted and zero indigenous cases attained in all 26 States/UTs that were under Categories 1 and 2 in 2014;
- By 2024, incidence of malaria reduced to less than 1 case per 1000 population in all States and UTs, and their districts;
- By 2027, indigenous transmission of malaria interrupted in all States and UTs of India; and
- By 2030, malaria eliminated throughout the entire country, and re-establishment of transmission prevented.

2.4 Programme Phasing

Malaria elimination in India will be carried out in a phased manner because the various States/UTs have different levels of malaria burden. While some low burden states are in

a position to plan action for malaria elimination right now, the high burden States will need to reduce the malaria burden first before proceeding towards elimination. Therefore, States and UTs have been categorized into phases, based on their API as primary criterion with due consideration given to ABER and SPR as secondary criteria. The categorization is given in table 2.1.

Table 2.1: Classification of States/UTs for malaria elimination in India

Category	Definition
Category 0 *Prevention of re- establishment phase*	States/UTs with zero indigenous cases of malaria *(Currently, no State/UT)*
Category 1 *Elimination phase*	States/UTs with API less than one, and all their districts reporting API < 1 *(15 States/UTs)*
Category 2 *Pre-elimination phase*	States/UTs with API < 1, but some of their districts reporting API ≥ 1 *(11 States)*
Category 3 *Intensified control phase*	States/UTs with API ≥ 1 *(10 States/UTs)*

The data on API and P. falciparum rates of all States and UTs are given in annex 1.

2.5 Milestones and Targets

The milestones and targets set for malaria elimination in India are as follows:

By the end of 2016

- All States and UTs have included malaria elimination in their broader health policies and planning framework

By 2020

- All 15 States/UTs that were under category 1 (elimination phase) in 2014 have completely interrupted malaria transmission and achieved zero indigenous cases and deaths due to malaria;
- All 11 States/UTs under category 2 (pre-elimination phase) in 2014 have entered into category 1 (elimination phase);
- 5 States/UTs under category 3 (intensified control phase) in 2014 have entered into category 2 (pre-elimination phase);
- 5 States/UTs under category 3 (intensified control phase) in 2014 have reduced disease burden but continue to remain in category 3; and
- Estimated malaria burden at national level has reduced by 15-20% as compared to 2014.

- Additionally, states with stronger health systems such as Gujarat, Maharashtra and Karnataka may implement accelerated malaria elimination programmes to achieve interruption of transmission and demonstrate early elimination followed by sustenance of zero indigenous cases.

By 2022

- All 26 States/UTs that were under categories 1 and 2 in 2014 have interrupted malaria transmission and achieved zero indigenous cases and deaths due to malaria;
- 5 States/UTs which were under category 3 (intensified control phase) in 2014 have entered into category 1 (elimination phase);
- 5 States/UTs which were under category 3 (intensified control phase) in 2014 have entered into category 2 (pre-elimination phase); and
- Estimated malaria burden at national level has reduced by 30-35% as compared to 2014.

By 2024

- All States and UTs and their districts have reduced API to less than 1 case per 1000 population at risk, sustain zero deaths due to malaria and establish fully functional malaria surveillance to track, investigate and respond to each case.
- 31 States/UTs have interrupted transmission of malaria and zero indigenous cases and deaths attained.
- 5 States/UTs which were under Category 3 (intensified control phase) in 2014 have entered into elimination phase.

By 2027

- Indigenous transmission of malaria interrupted, and the entire country has no indigenous cases and no deaths due to malaria

By 2030

- The entire country sustained status of zero indigenous cases and deaths due to malaria for 3 consecutive years; and India has initiated the processes for certification of malaria elimination status

2.6 Focus on High-Endemic Areas and Tribal Population

Most of the malaria cases in India are reported from Andhra Pradesh, Chhattisgarh, Jharkhand, Madhya Pradesh, Maharashtra, Meghalaya, Mizoram, Odisha, Telegana and Tripura. The high incidence in these States is particularly noted in tribal populations

living in foothills, forested or conflict-affected areas. The malaria programme plans to rapidly scale up interventions in these areas along with innovative strategies and strong partnerships to speedily reduce malaria morbidity and mortality.

2.7 Special Strategy for *P. vivax* Elimination

India accounts for more than 50% of the estimated *P. vivax* cases in the world[5]. Elimination *of P. vivax* from India is a serious challenge due to its magnitude as well as the need for a special strategy as *P. vivax* usually disappears from an area after *P. falciparum* because:

- *P. vivax* hypnozoites prolong the parasite's lifespan and are difficult to detect;
- RDTs currently available to detect *P. vivax* are less sensitive than RDTs for *P. falciparum* detection;
- Radical treatment for *P. vivax* requires 14 days of primaquine therapy to kill the hypnozoites whereas treatment for *P. falciparum* can be completed in only 3 days; and
- *P. vivax* strains have a longer incubation period

The states and UTs with *P. vivax* preponderance should now initiate special measures for elimination of *P. vivax*: expanding bivalent RDTs and quality microscopy services to detect all *P. vivax* infections; ensuring compliance of the 14-days radical treatment by affected individuals; and tackling urban malaria by targeting *An. stephensi* by antilarval measures.

2.8 District as the Unit of Planning and Implementation

States and UTs should categorize their districts so that even if the given state/UT is not yet in the elimination phase, their districts with API < 1 could be considered eligible for initiating elimination phase activities. (*The stratification of states and UTs based on API of their districts is given in annex 2.*) In addition, each district may sub-categorize its blocks into different phases based on their API; and further, each block into its PHCs, PHC into SCs and SC to villages. This would facilitate some category 2 districts to start elimination activities in their blocks falling in category 1. Stratification may be done in this manner up to the subcentre level.

The districts should carry out their stratification in October and states should compile district-wise stratification by November and Directorate of NVBDCP should prepare state-wise stratification by December. The data of the year with maximum cases in the past three years should be used for stratification purpose. For example, for the stratification exercise in October to December 2016, the data of 2013, 2014 and 2015

[5] Source: World Malaria Report 2014.

should be considered. The stratification would be part of the DIP/PIP; and presented and discussed in the annual action plan meetings.

Each district should stratify its PHCs and subcentres (with their population) into the following five strata, as those with:
(a) zero cases;
(b) API > 0 to <1;
(c) API 1 to < 2;
(d) API 2 to < 5; and
(e) API ≥ 5.

Based on the above information, each district should have ready information on PHCs, subcentres and even villages in each of the above five strata and also information on them moving from higher to lower endemicity. Each state must have the above information for all its districts and the Directorate of NVBDCP will have the information for all its States every year.

This would enable the programme to assess the progress towards elimination in a snapshot. In addition, the districts would prepare maps showing the stratification at the sub-district level and share it with the states and the states would share district and sub-district level maps with the Directorate of NVBDCP.

3. Strategies

The overall objectives of the malaria elimination programme are rapid reduction of transmission in areas with high malaria incidence; interruption of malaria transmission in low transmission areas; and prevention of re-establishment of malaria in areas where transmission has been interrupted.

The broad strategies of the malaria elimination framework are:

- Early diagnosis and radical treatment
- Case-based surveillance and rapid response
- Integrated vector management (IVM)
  - Indoor residual spray (IRS)
  - Long-lasting insecticidal nets (LLINs) / Insecticide treated bed nets (ITNs)
  - Larval source management (LSM)
- Epidemic preparedness and early response
- Monitoring and evaluation
- Advocacy, coordination and partnerships
- Behaviour change communication and community mobilization
- Programme planning and management

The specific objectives and key interventions recommended for each category of states/UTs are detailed below.

3.1 Category 3 (Intensified control phase: States/UTs with API ≥ 1)

Table 3.1 Specific objectives and key interventions of Category 3 states/UTs

Specific objectives	Key interventions
• Achieve universal coverage with malaria preventive and curative services • Establish an efficient system to reduce ongoing transmission of malaria • Reduce malaria-specific morbidity and mortality • Contain and prevent possible outbreaks of malaria, particularly among non-immune	• Massive scaling up of existing disease management and preventive approaches and tools, aimed at a significant reduction in the prevalence and incidence of malaria as well as associated deaths • Screening of all fever cases suspected for malaria • Classification of areas as per local malaria epidemiology and grading of areas as per risk of malaria transmission followed by implementation of tailored interventions • Strengthening of intersectoral collaboration • Special interventions for high-risk groups such as tribal populations and populations residing in conflict affected or hard-to-reach areas • One-stop centres or mobile clinics on fixed days in tribal

Specific objectives	Key interventions
high-risk mobile and migrant population groups • Emphasize reducing malaria morbidity and mortality in high transmission pockets such as tribal, hilly, forested and conflict affected areas	or conflict affected areas to provide malaria diagnosis and treatment, and increasing community awareness with the involvement of other agencies and service providers as required • Timely referral and treatment of severe malaria cases to reduce malaria-related mortality • Strengthening all district and sub-district hospitals in malaria endemic areas as per Indian Public Health Standards with facilities for management of severe malaria cases • Establishment of a robust supply chain management system • Maintenance of an optimum level of surveillance using appropriate diagnostic measures • Equipping all health institutions (primary health care level and above), especially in high-risk areas, with microscopy facilities and RDTs for emergency use and injectable artemisinin derivatives for treatment of severe malaria

3.2 Category 2 (Pre-elimination phase: States/UTs with API < 1, but some of their districts reporting API ≥ 1)

The states/UTs in pre-elimination phase are those close to entering the elimination phase. Therefore, malaria elimination interventions will be introduced with particular focus on setting up an elimination surveillance system and initiating elimination phase activities in those districts where the API has been reduced to less than 1 case per 1000 population at risk per year. The planning of elimination measures will be based on epidemiological investigation and classification of each malaria case and focus.

3.3 Category 1 (Elimination phase: States/UTs with API < 1, and all their districts reporting API < 1)

Table 3.2 Specific objectives and key interventions of Category 1 states/UTs

Specific objectives	Key interventions
• Interrupt transmission of malaria • Immediately notify each detected case	• All efforts will be directed at interrupting local transmission in all active foci of malaria. • Mandatory notification of each case of malaria from the private sector, other organized government sectors or any other health facility • Adequate case-based surveillance and complete case

Specific objectives	Key interventions

• Detect any possible continuation of malaria transmission
• Determine the underlying causes of residual transmission
• Forecast and prevent any unusual situations related to malaria; ensure epidemic preparedness and respond in a timely and efficient manner to outbreak situations
• Prevent re-establishment of local transmission of malaria
• Ascertain elimination of malaria
	management established and fully functional across the entire country to handle each case of malaria
	• Investigation and classification of all foci of malaria
	• A strict total coverage of all active foci by effective vector control measures
	• Early detection and treatment of all cases of malaria by means of ACD and/or PCD to prevent onward transmission
	• State and national level malaria elimination database established and made operational
	• Implementation of interventions for effective screening, management and prevention of malaria among mobile and migrant populations
	• Establishment of an effective epidemic forecasting and response system
	• Ensuring rigorous quality assurance of all medicines and diagnostics
	• Setting up a national-level reference laboratory to serve following two functions:
	  • 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.
	  • Training of master trainers and accreditation/certification of microscopists as per Indian Public Health Standards shall also be undertaken at this laboratory.
	• 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.
	• Surveillance of special groups, migrant populations or populations residing in the vicinity of industrial areas are also to be covered under surveillance operations

3.4 Category 0 (Prevention of Re-establishment Phase)

The probability of malaria becoming re-established in a malaria free area varies with the level of receptivity and vulnerability of the area. If either of these factors is zero, the probability of malaria becoming re-established is zero even if the other factor has a high value. When importation of malaria due to the arrival of migrants from a malarious area coincides with increase in receptivity because of halted vector control measures or development activities in an area for example, re-establishment of malaria transmission is possible. In the absence of appropriate action, the area is likely to become malarious again.

When any area, whether a state/UT or a district within a state/UT, has achieved malaria elimination, the specific objectives will be as follows:

- Detect any re-introduced case of malaria;
- Notify immediately all detected cases of malaria;
- Determine the underlying causes of resumed local transmission;
- Apply rapid curative and preventive measures;
- Prevent re-introduction and possible re-establishment of malaria transmission; and
- Maintain malaria-free status in these areas.

These goals will be achieved by proactively identifying all individuals who carry the malarial parasites and treating them so that onward transmission of infection is stopped. This will be supplemented by targeted and tailored mosquito control measures to reduce vector density and minimize vector-human contact.

4. Surveillance

Surveillance is defined as ongoing, systematic collection, analysis and interpretation of disease-specific data for use in planning, implementing and evaluating the public health practice. Surveillance is carried out at different levels of the health care system (e.g. health facility-based, community-based), and using different detection systems (e.g. case-based, active, passive), and through sentinel sites and surveys. Malaria surveillance is based on active case detection (ACD) and passive case detection (PCD).

ACD is carried out by trained community level health care workers (MPHW/ANM) through fortnightly house-to-house visits and testing people with current or recent fever and chills in past 14 days with bivalent antigen detecting RDTs. If the RDT result is positive, treatment appropriate to the plasmodium species is initiated.

PCD is the detection of malaria cases among people who go at their own initiative to a health volunteer (ASHA/CHV/AWW) or health facility (subcentre, PHC etc.) to get treatment, usually for a febrile illness. Currently, trained ASHAs deployed in malaria endemic areas are increasingly contributing to malaria case detection in India. Cases detected by PCD signify the healthcare seeking behaviour of the population based on recognition of their illness. In order to detect maximum numbers of malaria cases by PCD, people living in malaria endemic areas should be informed that their fever could be due to malaria and that the disease is dangerous if not treated early. They should also be informed about where they can obtain quality treatment for malaria. This is particularly important for migrants to endemic areas (e.g. temporary labour), who may be ignorant both of what malaria is and where treatment is available.

The surveillance activities given below are in the perspective of states. However, states have to further stratify and categorise their districts, PHCs and subcentres for the appropriate surveillance activities.

Category 3 (Intensified control phase)

- ACD will be carried out by trained community level health care worker (MPHW/ANM) with bivalent antigen detecting RDTs through fortnightly house-to-house visits.
- PCD will be done by trained community level health care volunteer (ASHA/ CHV) and at subcentres with bivalent antigen detecting RDTs.
- PCD at PHCs will be done through microscopy; however, bivalent antigen detecting RDTs will be used in emergent situations, odd hours, non-availability of LT or until microscopy centre is made functional.
- PCD at CHCs/hospitals/medical colleges will be done through microscopy only; however, bivalent antigen detecting RDTs will be used in emergent situations and odd hours.

- PCD by health providers in private and other sectors will be done through microscopy (where results can be made available within 24 hours) or by bivalent antigen detecting RDT. All attempts should be made to strengthen their microscopy facilities.
- If a fever case is found to be positive for malaria, treatment should be initiated within 24 hours of detection and complete treatment ensured.
- Strengthening of referral system should be done including transportation facilities for severe cases.
- Sentinel site surveillance should be strengthened to find out the reasons for development of severe malaria, improve case management and prevent deaths due to malaria.
- Surveillance should sustain monthly blood examination rate (MBER) of minimum 1.5% during transmission months.

Category 2 (Pre-elimination phase)

- Same as for Category 2 given above. In addition, more focussed attention is recommended for surveillance in project areas & construction sites and among migrant populations & slum populations.
- The monthly blood examination rate (MBER) should be sustained at a minimum of 1% during transmission months.

Category 1 (Elimination phase)

- Malaria should be made notifiable.
- ACD will be carried out by trained community level health care worker (MPHW/ANM) by house-to-house fortnightly visits and collecting smears for microscopy. However, in areas where the microscopy results are not available within 24 hours, bivalent antigen based RDT will be used and RDT negative patient strongly suspected of malaria will be cross-checked by microscopy.
- PCD will be done by trained community level health care provider (ASHA/subcentre) by blood smear collection for microscopy. However, in areas where the microscopy results are not available within 24 hours, RDT will be used and RDT negative patients strongly suspected of malaria will be cross-checked by microscopy.
- PCD will be done at health facilities (PHC and above), including private and other sectors by microscopy. However, bivalent antigen detecting RDT will be used in emergent situations and odd hours, when microscopy facility is not readily available.
- If a fever case is found to be positive for malaria, it should immediately be notified to DVBDCO, SPO, RoHFW and Directorate of NVBDCP and the following actions should also be taken:

  - Treatment should be initiated within 24 hours of detection and complete treatment ensured.
  - Detailed case investigation in the prescribed format should be carried out by Vector Borne Disease Technical Supervisor (VBDTS)/MPHW and the case should be classified as imported or indigenous. Case investigation should be completed within 3 days of detection.
  - Contact survey should be carried out by blood smear collection for microscopy in the surrounding 50 households by a team comprising of ASHA and MPHW/VBDTS.
  - If additional cases are found on contact survey, the survey area should be expanded and appropriate actions initiated within 7 days.

- The ABER should be sustained at minimum 7% in perennial transmission areas and minimum 5% in seasonal transmission areas.

Category 0 (Prevention of re-establishment phase)

- Malaria should be made notifiable.
- Any fever case reporting to a health care provider/facility ((including private and other sectors) should be ascertained whether it meets the definition of suspected malaria case.
- If the fever case meets the definition of suspected malaria, the case should be investigated using microscopy.
- If the case is found to be positive for malaria, it should be immediately notified to the DVBDCO, SPO, RoHFW and Directorate Of NVBDCP and following actions should also be taken:
  - Treatment should be initiated within 24 hours of detection and complete treatment ensured.
  - Detailed case investigation in the prescribed format should be carried out by VBDTS/MPHW and the case should be classified as imported or indigenous. Case investigation should be completed within 3 days of detection.
  - Contact survey should be carried out by blood smear collection for microscopy in the surrounding 50 households by a team comprising of ASHA and MPHW/VBDTS.
  - If additional cases are found on contact survey, the survey area should be expanded and appropriate actions initiated within 7 days.
  - The positive cases should be followed up to ensure completion of treatment.
- Screening at points of entry at international and inter-state borders should be established for the purpose of cross-reporting, enumeration of cases and public health action.

Case-based surveillance

Each confirmed case of malaria in category 0 and 1 areas requires both detailed epidemiological case and focus-based investigation. The investigating team should consist of the district-level epidemiologist (team leader), a skilled laboratory technician, entomological staff member and the local health facility personnel.

Case investigation

The investigation should be completed within 3 days of notification of a new case and consist of:

- Obtaining details of the confirmed case;
- Review of details of cases reported previously in the same locality;
- Active screening of each focus where the case reported is likely to harbour parasites; and
- Deciding on whether the case is indigenous or imported.

The case investigation is done 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, is also reviewed next including age, sex, occupation, timing and species involved in previous cases and maps of the location of cases (by house and village). Based on these details, a preliminary assessment of the likely locality and source of infection is made and all details are recorded in the case investigation form.

The correct epidemiological classification of malaria cases is crucial in malaria elimination, as it is the basis for further surveillance and implementing appropriate elimination measures. Internationally the classification of cases is as induced; imported; relapse; introduced; indigenous; and locally acquired (also called ‘autochthonous’). However, for program purpose cases may be grossly classified as indigenous and imported.

For definition of cases, refer glossary. The key for epidemiological classification of malaria cases is given in annex 3 and the format for the malaria case investigation form in annex 4.

Focus investigation

Once a case of locally acquired malaria has been detected, the second stage of surveillance, i.e. focus investigation is carried out to describe the area where malaria occurred and delineate the population at risk. A malaria focus is defined as a

circumscribed area in a currently or former malarious area that contains the epidemiologic and ecological factors necessary for malaria transmission. An entomologist should participate in the focus investigation which will identify the features of the location, including the populations at greatest risk, any ongoing control measures, the *Anopheles* species responsible for transmission, location of breeding sites, when transmission occurs and vector's susceptibility to insecticides. A map should also be drawn, with standard keys, to show the geographical features relevant for malaria transmission (e.g. rivers, rice fields, dams, ponds, forests, roads, altitude etc.). The focus investigation is aimed at finding the factors contributing to the malaria transmission, for example, vector breeding may depend on particular environmental factors (e.g. man-made breeding sites in arid areas), or exposure to vector biting may be linked to particular human behaviour (e.g. sleeping outdoors) or occupations (e.g. border guards or agricultural workers) and thus help in choosing the appropriate intervention(s) for interrupting malaria transmission in the locality.

Once the focus investigation is completed, the focus is classified into active focus, cleared-up focus, potential focus, pseudo-focus; or pseudo-focus.

For definitions of foci, refer glossary. The key for operational classification of malaria foci is given in annex 5 and the format for the focus investigation form is given in annex 6.

Sentinel surveillance

Malaria surveillance data available through the routine MIS does not provide the needed information on severe malaria cases as a large number of patients seek health care from the private sector and do not figure in the programme data. Therefore, the sentinel surveillance system has been established in in selected hospitals in high malaria endemic districts in hospitals with large caseloads. A sentinel site medical officer (SSMO) is in charge of all activities regarding malaria in the sentinel sites and a sentinel site laboratory technician (SSLT) works under the supervision of the SSMO and is responsible for the quality of the malaria laboratory results and for data compilation.

The guidelines for establishing sentinel surveillance sites along with formats for the sentinel site register and sentinel site reporting form can be accessed from the NVBDCP weblink http://nvbdcp.gov.in/Doc/SSH_Management_Malaria_update.pdf

Lot quality assurance sampling (LQAS) surveys

LQAS survey is a tool to monitor the quality and coverage with interventions. The malaria program has introduced LQAS surveys for generating information on important process and outcome indicators at the block level, aimed at taking mid-course corrective measures. Conducting periodic LQAS surveys provides valuable information to help program monitoring, planning and implementation at all levels, i.e. PHC, district, State and Directorate

of NVBDCP. LQAS surveys are ideally done on a quarterly basis for category 2 and 3 states/UTs. At present, LQAS surveys are being carried out in the seven North-eastern states and Andhra Pradesh, Chhattisgarh, Gujarat, Jharkhand, Karnataka, Madhya Pradesh, Maharashtra, Odisha, Telangana and West Bengal. The modules and formats for LQAS surveys can be accessed in the NVBDCP weblink http://nvbdcp.gov.in/Doc/8-Annex.%2017%20LQAS.MTS.pdf. States under categories 2 and 3 should plan to expand the training of VBDTS and other concerned staff for carrying out LQAS surveys.

Other surveys

The program organises plans to conduct surveys every 2-3 years through independent agencies at each milestone as enlisted in the National Framework for Malaria Elimination. Experts from WHO, NIMR and other selected institutions would be involved in the surveys.

5. Diagnosis and Case Management

5.1 Diagnosis

A suspected malaria case is a patient with fever in an endemic area during transmission season, or who has recently visited an endemic area, without any other obvious cause of fever like:

- Cough and other signs of respiratory infection
- Running nose and other signs of cold
- Diarrhoea
- Pelvic inflammation indicated by severe low back ache, with or without vaginal discharge and urinary symptoms
- Skin rash suggestive of eruptive illness
- Burning micturition
- Skin infections e.g. boils, abscess, infected wounds
- Painful swelling of joints
- Ear discharge

A confirmed malaria case (or infection) is one in which the parasite has been detected by a diagnostic test, i.e. microscopy, rapid diagnostic test, or molecular diagnostic test.

Any trained volunteer, ASHA, health worker/professional receiving a case of suspected malaria must immediately initiate a diagnostic test by antigen detecting bivalent RDT or microscopy as per category specific guidelines detailed in chapter on surveillance. RDTs should be used in PHC and other higher health facilities for diagnosis of malaria cases only in emergent situations and odd hours.

5.1.1 Microscopy

Microscopy is the gold standard for malaria diagnosis. Availability of quality microscopy for malaria diagnosis is mandatory at all PHCs and above levels. All laboratory technicians including those from the TB and HIV programmes should be adequately trained and involved in malaria microscopy.

It is important to get microscopy results at the earliest to start prompt malaria treatment. All efforts should be taken to expedite transportation of slides to the laboratory, ensuring the slides are tested with urgency, and results communicated back to the community level health care provider. All possible options for slide transportation should be explored, for example, bus or any other vehicle making daily trips to the PHC/CHC town, postmen, teachers, higher class school children or other workers who go daily from the village to the town. For transportation, the slides should be packed well to

ensure that they do not get damaged during transportation. The results from the laboratory may be conveyed to the concerned health care provider through established mechanism or through telephone (landline/mobile/SMS), making sure that there is no discrepancy in patient identification.

5.1.2 RDT

Quality assured antigen detecting bi-valent RDTs as per the technical specifications of NVBDCP are recommended for use under the programme. If there is a high clinical suspicion of malaria (intermittent fever with rigors and sweating in a high-endemic area) in a RDT negative patient when no other cause can be found, the RDT should be repeated after about 24 hours and all efforts made to obtain the microscopy result rapidly.

Antigens can persist for up to 4 weeks after clearance of asexual parasitaemia resulting in false positive test results. If a patient, who has been treated, is febrile within one month after the treatment and the RDT is positive, the malaria diagnosis should be confirmed by microscopy before treatment is started.

The SoPs on the use of microscopy and antigen based bi-valent RDTs are available at the NVBDCP website.

5.2 Case Management

The objectives of malaria case management are to:

- ensure radical clinical and parasitological cure to malaria cases;
- prevent severe malaria and deaths due to malaria;
- reduce malaria transmission; and
- prevent relapses of *P. vivax* malaria

5.2.1 Treatment of *P. vivax* malaria

P. vivax cases should be treated with chloroquine for three days and primaquine for 14 days. Primaquine is used to prevent relapse. The total dose of chloroquine is 25 mg/kg body weight divided over three days, i.e. 10 mg/kg bw on day 1, 10 mg/kg bw on day 2 and 5 mg/kg bw on day 3. Primaquine is given in a dose of 0.25 mg/kg bw daily for 14 days. The dosage chart for different age groups of patients for treatment of uncomplicated *P. vivax* malaria is given in table below.

Table 5.1 Dosage chart for treatment of uncomplicated *P. vivax* malaria

Age group	Day 1		Day 2		Day 3		Day 4-14
	CQ (150 mg base)	PQ (2.5 mg)	CQ (150 mg base)	PQ (2.5 mg)	CQ (150 mg base)	PQ (2.5 mg)	PQ (2.5 mg)
Less than 1 year	½	0	½	0	¼	0	0
1-4 years	1	1	1	1	½	1	1
5-8 years	2	2	2	2	1	2	2
9-14 years	3	4	3	4	1½	4	4
15 years or more	4	6	4	6	2	6	6

CQ: Chloroquine (250 mg tablet contains 150 mg base); PQ: Primaquine

Note: Primaquine is contraindicated in infants, pregnant women and individuals with G6PD deficiency. Special care should be taken in patients with anaemia. 14-days regimen of Primaquine should be given under supervision. The patient should be followed up to ensure compliance to 14 day treatment with Primaquine. Patients given primaquine must be instructed to stop primaquine if they develop high colouration of urine or blue colouration of lips and report immediately to the MO. Primaquine should be stopped in such cases.

5.2.2 Treatment of *P. falciparum* malaria

It is important to start the treatment for falciparum malaria immediately on diagnosis to prevent progression of the disease to severe malaria and prevent deaths due to malaria. The treatment for falciparum malaria is with Artemisinin based combination therapy (ACT) with a single dose of primaquine added on the second day of treatment. Artesunate with Sulfadoxine-pyrimethamine (ACT-SP) is the ACT combination used in all States and UTs of India except the NE States where due to onset of resistance to ACT-SP, Artemether-Lumefantrine (ACT-AL) is to be used.

Treatment of *P. falciparum* cases in all States except North-Eastern States

The dosage of ACT-SP is artesunate 4 mg/kg body weight daily for 3 days plus Sulfadoxine (25 mg/kg body weight) and Pyrimethamine (1.25 mg/kg body weight) on day 1 and primaquine 0.75 mg/kg body weight on day 2.

ACT-SP has been made available in different coloured blister packs for different age groups of patients to facilitate its use by field level staff. The dosage schedule and the ACT blister pack colour for different age groups is given in table below.

Table 5.2: ACT-SP dosage schedule for treatment of *P. falciparum* malaria in various age groups in all States and UTs except North Eastern States

Age group (in years)	Colour of blister pack	Day – 1		Day – 2		Day – 3
		AS	SP	AS	PQ	AS
0-1	Pink	1 Tablet (25 mg)	1 tablet (250 mg + 12.5 mg)	1 tablet (25 mg)	Nil	1 tablet (25 mg)
1-4	Yellow	1 tablet (50 mg)	1 tablet (500 mg + 25 mg)	1 tablet (50 mg)	1 tablet (7.5 mg base)	1 tablet (50 mg)
5-8	Green	1 tablet (100 mg)	1 tablet (750 mg + 37.5 mg)	1 tablet (100 mg)	2 tablets (7.5 mg base each)	1 tablet (100 mg)
9-14	Red	1 tablet (150 mg)	2 tablets (500 mg +25 mg each)	1 tablet (150 mg)	4 tablets (7.5 mg base each)	1 tablet (150 mg)
15 & above	White	1 tablet (200 mg)	2 tablets (750 mg + 37.5 mg each)	1 tablet (200 mg)	6 tablets (7.5 mg base each)	1 tablet (200 mg)

Notes:

- SP is not to be given to children below 5 months of age and they should be treated with an alternate ACT
- Primaquine and ACT-SP are not to given to pregnant women and they should be treated with an suitable alternate ACT

Treatment failures with ACT are very rare and in most cases, failure to respond to treatment is due to inadequate patient compliance. However, any ACT treatment failure should be treated with quinine plus tetracycline/doxycycline/clindamycin for 7 days. Resistance should be suspected if in spite of full treatment with ACT and with no history of vomiting or diarrhoea, there is no clinical or parasitological response in the patient after 72 hours. These instances should be reported to the DVBDCO/SPO/ROHFW for initiation of therapeutic efficacy studies.

As there is a risk of the parasite developing artemisinin resistance, oral monotherapy with artemisinin derivatives should not be given under any circumstance for uncomplicated malaria. Therefore, the Drug Controller General (India) has issued instructions to the State

drug controllers to not issue any new license for oral artemisinin derived monotherapies and for licenses granted earlier to be withdrawn.

Adverse effects to ACT should be reported to the Directorate of NVBDCP with individual case reports. NIMR is also monitoring safety of ACTs in sentinel sites as part of its pharmacovigilance mechanism.

Sulfadoxine in ACT-SP can, in rare cases, cause serious cutaneous or mucocutaneous eruptions and/or agranulocytosis. Any patient with such reactions developing within a month after taking ACT-SP should be considered allergic to sulphonamides and not be given sulphonamides again.

Treatment of clinically suspected malaria cases in *P. falciparum* predominant endemic areas should be started with chloroquine if RDT is not available and also microscopy result unlikely to be available within 24 hours of the patient reporting to the health care provider. Chloroquine treatment should be continued in these cases till the full course is completed or till the microscopy results are received. If a positive microscopy result is received, appropriate treatment as per the plasmodium species should be administered. Presumptive treatment of fevers with chloroquine is not recommended.

Treatment of uncomplicated *P. falciparum* cases in NE States

Due to signs of *P. falciparum* developing resistance to ACT-SP in some areas in the NE States, Artemether-lumefantrine (ACT-AL) has been introduced as the ACT combination to be used for treatment of *P. falciparum* cases in NE States under the national drug policy. It is available as a co-formulation with each tablet containing 20 mg artemether and 120 mg lumefantrine. The dosage schedule for treatment of P. falciparum malaria in various age groups in NE States is given in table below.

Table 5.3: ACT-AL dosage schedule for treatment of *P. falciparum* malaria in various age groups in NE States

ACT-AL	5-14 Kg (5 months to < 3 years age)	14-24 Kg (≥ 3 to 8 years)	25-34 Kg (≥ 9 to 14 years)	More than 34 Kg (> 14 years
Dosage (in mg)	20 mg/120 mg twice daily x 3 days	40 mg/240 mg twice daily x 3 days	60 mg/360 mg twice daily x 3 days	80 mg/480 mg twice daily for 3 days
Dosage (in number of tablets)	1 tablet twice daily x 3 days	2 tablets twice daily x 3 days	3 tablets twice daily x 3 days	4 tablets twice daily x 3 days
Number of tablets in each pack	6	12	18	24
Colour of pack	Yellow	Green	Red	White

Notes:

- Primaquine is given in a single dose of 0.75 mg/kg body weight on day 2 for its gametocytocidal properties
- ACT-AL is not to be used in women in 1st trimester of pregnancy.
- Treat infants weighing < 5 kg with uncomplicated P. falciparum malaria with an ACT at the same mg/kg bw target dose as for children weighing 5 kg.[6]

Treatment of *P. falciparum* malaria in pregnancy

Malaria in pregnancy, especially malaria due to *P. falciparum*, is a serious condition as there is reduction of haemoglobin with each bout of fever rapidly leading to severe anaemia. There is a high risk of abortion with malaria in early pregnancy and increased chances of stillbirth, intrauterine growth retardation and low birth weight with malaria later in the pregnancy. Therefore, every effort should be made in pregnant women to diagnose and treat malaria at the earliest.

WHO treatment guidelines state that use of ACTs is safe in the second and third trimesters, and, in severe malaria it is considered that the benefits of artemisinin derivatives outweigh the possible side-effects. Before starting treatment for *P. falciparum* malaria, women in reproductive age group (15-45 years) should be asked about their pregnancy status and if the answer is no or the pregnancy test is negative, they should be treated with ACT. If the answer is yes, they should be referred to the subcentre for treatment with quinine. If the answer is uncertain, a pregnancy test is done or the woman referred for quinine treatment.

The treatment for uncomplicated *P. falciparum* cases in pregnancy in 1st trimester is a quinine salt given in a dose of 10mg/kg body weight three times daily for 7 days. Quinine should not be taken on an empty stomach as it may induce hypoglycaemia. Quinine produces unpleasant side-effects in most patients, e.g. metallic taste, nausea and sometimes tinnitus (ringing in ears). The patients should be explained that such side-effects may occur, but they are not dangerous and it is very important that they complete the full prescribed treatment. The treatment in 2nd and 3rd trimesters are ACT-AL in NE States and any ACT combination other than ACT-SP.

Instructions on drug intake

The first oral dose in malaria treatment should always be consumed in the presence of the health care provider. Children under 5 years of age and pregnant women should be asked to wait for 15 minutes after taking the dose. If there is no vomiting, the remaining part of the blister pack is given to the patient/caretaker to take home with the following instructions clearly:

[6] Source: Guidelines for the treatment of malaria, Third edition, WHO, Geneva, 2015

- The patient should complete the full treatment
- If the treatment is not completed as prescribed, the disease may recur, in a more serious form which may be more difficult to treat
- Bed nets should be used by the patient to prevent the spread of malaria

If the patient vomits within the 15 minutes under observation of the health care provider after taking the first dose of the drug, he/she should be allowed to rest for 15 minutes and then the dose is repeated by opening a new blister pack and discarding what remains of the previous blister pack. If the patient vomits again, the case should be considered as a case of severe malaria and managed accordingly.

5.2.3 Treatment of mixed infections with *P. vivax* and *P. falciparum*

All mixed infections should be treated with a full course of ACT (ACT-AL in NE States and ACT-SP in other States) for 3 days and primaquine 0.25 mg/kg bw daily for 14 days.

5.2.4 Treatment of *P. ovale* and *P. malariae*

P. ovale and *P. malariae* are very rarely found in a few places in India. The treatment for *P. ovale* malaria is the same as that for *P. vivax* and the treatment for *P. malariae* is same as that for *P. falciparum*.

5.2.5 Severe malaria[7]

For epidemiological purposes, severe falciparum malaria is defined as one or more of the following, occurring in the absence of an identified alternative cause and in the presence of *P. falciparum* asexual parasitaemia.

- *Impaired consciousness.* A Glasgow coma score < 11 in adults or a Blantyre coma score < 3 in children

- *Prostration.* Generalized weakness so that the person is unable to sit, stand or walk without assistance

- *Multiple convulsions.* More than two episodes within 24 hours

- *Acidosis.* A base deficit of > 8 mEq/L or, if not available, a plasma bicarbonate level of < 15 mmol/L or venous plasma lactate ≥ 5 mmol/L. Severe acidosis manifests clinically as respiratory distress (rapid, deep, laboured breathing).

[7] Source: Guidelines for the treatment of malaria, Third edition, WHO, Geneva, 2015

- *Hypoglycaemia.* Blood or plasma glucose < 2.2 mmol/L (< 40 mg/dL)

- *Severe anaemia.* Haemoglobin concentration ≤ 5 g/dL or a haematocrit of ≤ 15% in children < 12 years of age (< 7 g/dL and < 20%, respectively, in adults) with a parasite count > 10,000/μL

- *Renal impairment.* Plasma or serum creatinine > 265 μmol/L (3mg/dL) or blood urea > 20 mmol/L

- *Jaundice.* Plasma or serum bilirubin > 50 μmol/L (3 mg/dL) with a parasite count > 100,000/μL

- *Pulmonary oedema.* Radiologically confirmed or oxygen saturation < 92% on room air with a respiratory rate > 30/min, often with chest in-drawing and crepitation on auscultation

- *Significant bleeding.* Including recurrent or prolonged bleeding from the nose, gums or venepuncture sites; haematemesis or malaena

- *Shock.* Compensated shock is defined as capillary refill ≥ 3 s or temperature gradient on leg (mid to proximal limb), but no hypertension. Decompensated shock is defined as systolic blood pressure < 70 mm Hg in children or < 80 mm Hg in adults, with evidence of impaired perfusion (cool peripheries or prolonged capillary refill).

- *Hyperparasitaemia. P. falciparum* parasitaemia > 10%

It should be noted that febrile convulsions, repeated vomiting and dehydration are common in children if the temperature is high due to any cause and therefore, not necessarily indicative of severe malaria. However, such symptoms could be due to severe malaria and there should be no delay in transferring these children to a health facility fully equipped for diagnosis and management of severe malaria cases.

Diagnosis of severe malaria

All attempts should be made to confirm the diagnosis of severe malaria cases by microscopy or RDTs. At PHCs, CHCs and district level hospitals, RDTs should be used only in emergency hours and when the laboratory technician is not available. For follow up and monitoring the progress, only microscopy should be done.

Criteria for referral

The community members come in contact with ASHA/CHV and MPHW (M & F) as a routine and depend on these persons for advice and treatment for different diseases,

including malaria. These health care providers should be instructed that if the patient does not get relief from symptoms of malaria within 24 hours, and/or headache/fever continues to increase, the patient should report to the nearest PHC/CHC/hospital. Medical officers while training these workers should emphasize the need to recognize a serious case of malaria before it is too late. These workers should be conversant with the following signs and symptoms of malaria which indicate serious complications of malaria.

- Persistence of fever even 48 hours after initiating treatment
- Continuous vomiting and inability to retain oral drugs
- Headache continuing to increase
- Severe dehydration, seen as dry, parched skin or sunken face
- Feeling too weak to walk
- Change in sensorium e.g. confusion, drowsiness, blurring of vision, photophobia, disorientation
- Convulsions
- Bleeding and clotting disorders
- Suspicion of severe anaemia
- Jaundice
- Hypothermia

The DVBDCO should have a list all facilities in the district where facility for emergency care of severe malaria is available and ensure that the list is available at all PHCs. The MO-PHC should liaise with all nearby referral facilities and ensure that contact details of these centres are available with the peripheral health workers. The MO should also identify the mode of transport (including private transport, if government vehicles are not available) from each specific area to the referral centre and establish arrangements for timely transportation of severe malaria cases using untied funds under Rogi Kalyan Samiti (RKS) of NHM. The referral facility to which a patient is referred is to be put on alert when the evacuation of the patient is started.

Pre-referral treatment

Severe malaria is an emergency and treatment should be given as per severity and associated complications which can be best decided by the treating physicians. Before admitting or referring patients, the attending doctor or health worker, whoever is able to do it, should perform RDT and take a blood smear; give an intramuscular dose of artemisinin derivative, preferably artesunate or artemether, and if not available, quinine and send the case sheet with details of treatment history and the blood slide with the patient.

Treatment of severe malaria

Parenteral artesunate is the treatment of choice for all severe malaria. It is essential that full doses of effective parenteral antimalarial treatment be given promptly in the initial

treatment of severe malaria, followed by a full dose of ACT orally. In case parenteral Artemisinin derivatives are not available readily, injection Quinine can be used.

Treatment of severe malaria during pregnancy

Women in the second and third trimesters of pregnancy are more likely to have severe malaria than other adults. Parenteral artesunate is the treatment of choice in all trimesters. Treatment must not be delayed. If artesunate is not available, intramuscular artemether should be given, and if this is unavailable, then parenteral quinine should be started immediately until artesunate is obtained.

Treatment of severe *P. vivax* malaria

Although *P. vivax* is considered to be benign, with a low case-fatality rate, it may cause a debilitating febrile illness with progressive anaemia and can also occasionally cause severe disease, as in *P. falciparum* malaria. Severe vivax malaria is defined as for falciparum malaria but with no parasite density thresholds. Reported manifestations of severe *P. vivax* malaria include severe anaemia, thrombocytopenia, acute pulmonary oedema and, less commonly, cerebral malaria, pancytopenia, jaundice, splenic rupture, haemoglobinuria, acute renal failure and shock.

Prompt effective treatment and case management should be the same as for severe *P. falciparum* malaria. A full course of radical treatment with primaquine should be given after recovery.

Details on treatment of severe malaria and the complications can be accessed from the NVBDCP weblink http://nvbdcp.gov.in/Doc/SSH_Management_Malaria_update.pdf

5.3 Treatment of Asymptomatic Cases

Asymptomatic malaria infections detected by microscopy only will be considered as asymptomatic cases. Appropriate treatment according to the species should be given to these cases as per the national drug policy.

5.4 Chemoprophylaxis

Chemoprophylaxis should be administered only in selected groups in high *P. falciparum* endemic areas. Use of personal protection measures including ITN/LLIN should be encouraged in pregnant women and other vulnerable populations including travellers intending to stay for a long period in high-endemic areas. However, for longer stay of military and para-military forces in high *P. falciparum* endemic areas, the practice of chemoprophylaxis should be followed wherever appropriate e.g. troops on night patrol duty or based on decisions of their medical administrative authorities.

For short term chemoprophylaxis (up to 6 weeks) of malaria, doxycycline is used in a dose of 100 mg once daily for adults and 1.5 mg/kg once daily for children (contraindicated in pregnant women and children below 8 years age). The drug should be started 2 days before travel and continued for 4 weeks after leaving the malarious area.

Chemoprophylaxis for stays more than 6 weeks is with mefloquine 250 mg weekly for adults and should be started two weeks before entering the high-risk area, continued during the stay and till four weeks after leaving the area. Mefloquine is contraindicated in individuals with history of convulsions, neuropsychiatric problems and cardiac conditions. Therefore, necessary precautions should be taken to ensure that individuals being administered mefloquine do not have these conditions.

6. Integrated Vector Management (IVM)

6.1 Definition and Scope of IVM

Integrated vector management (IVM) is defined by WHO as a rational decision making process for the optimal use of resources for vector control. It entails use of a range of biological, chemical and physical interventions of proven efficacy, separately or in combination, in order to implement cost-effective control and reduce reliance on any single intervention.

The integrated approach of IVM addresses several disease with vector control tools, often in combination and synergistically; involves use of chemical and non-chemical methods; and integrates with other disease control methods, viz. drugs and vaccines.

The major elements of the IVM strategy are an integrated approach; evidence based decision making; collaboration within the health sector and with other sectors; advocacy, social mobilization and legislation; and capacity building.

The vector control and personal protection measures include:

- Adult mosquito control: IRS
- Personal protection and adult mosquito control: bed nets, including LLINs/ ITNs
- Larval control: source reduction and chemical, biological and environmental measures

6.2 Malaria Vectors in India

Anopheline mosquitoes are found in all parts of India from the sea level up to an altitude of 2000-2500 metres. Out of 58 species of anophelines in India, 9 species are proven vectors of malaria.

Principal vectors (6)

- *Anopheles culicifacies*
- *An. fluviatilis*
- *An. minimus*
- *An. philippinensis*
- *An. dirus*
- *An. stephensi*

Secondary vectors (3)

- *An. annularis*
- *An. varuna*
- *An. sundaicus*

The malaria vectors, transmission potential and endemicity levels differ from area to area and therefore the intervention measures are also tailored for implementation. *The bionomics of malaria vectors in India is given in annex 7 and details of entomological surveillance in annex 8.*

The prioritization for implementation of vector control measures in India is broadly based on the API of the area. Stratification for IVM activities is required to be done up to subcentre level which is the unit for IVM. The category-wise vector control measures recommended are given in table below.

Table 6.1 Category-wise vector control measures

Category of subcentre	Vector control measures
Category 0 (No case)	• Mapping of potential vector breeding sites • Regular adult vector monitoring (prevalence and density). • Environmental management and modification in rural areas through Village Health, Sanitation & Nutrition Committee (VHSNC),MNREGA & Swachh Bharat Abhiyan and in urban areas by desiliting, deweeding, channelizing, larviciding, through Urban VBD scheme. • Biological control- Larvivorous fish • Foci based adult vector control interventions – in and around 50 houses of positive case- Space spray followed by IRS
Category 1, 2 and 3 States	
Subcentres with API < 1	• Same as in category 0 above
Subcentres with API ≥ 1	• Universal coverage with LLINs of all subcentres with API > 1 • In sub centres with API>1, if not covered with LLIN, two regular rounds of supervised IRS (sub centre as unit) • In LLIN covered subcentre, if there is upsurge of cases, efforts to be made to increase the compliance rate of LLIN usage. • In outbreak situations - additional round of IRS • Anti larval measures in urban areas with main focus in slum clusters. In outbreak situation Slum clusters can also be covered with IRS. • Larval control through source reduction and biological and environmental measures
• Low endemic sub centres i.e. with 0 or <1 API should be treated as under Category 1 activities.	

For details on implementation of IVM please refer operational manual on IVM in India http://nvbdcp.gov.in/Doc/IVM10_March_2016.pdf

All people living in areas where the risk of malaria is high should be protected through the provision, use and timely replacement of LLINs or, where appropriate, IRS. LLINs are particularly useful in areas where IRS is operationally difficult to execute satisfactorily. A second core intervention should not be introduced as a means of compensating for deficiencies in the implementation of the first. However, IRS with non-pyrethroid insecticide may be added in certain situations in order to either prevent or mitigate resistance in areas where LLINs are routinely used. However, mosquitoes that bite in the early evening or which are outdoor biting or resting, can evade the LLINs or IRS effects, leading to residual malaria transmission. Transmission also continues when people are away from houses or otherwise not under nets at the times when the vectors prefer to bite.

6.3 Components of IVM

6.3.1 Indoor Residual Spray (IRS)

IRS is appropriate in settings where vector mosquitoes enter houses and rest on sprayed surfaces. The effectiveness of IRS depends on adherence to the laid down criteria of the insecticide and spray procedure, public acceptance of spraying, use of well-maintained equipment, adequately trained personnel, good coverage and effective supervision. IRS should aim at a coverage of minimum 80% of targeted households and area, as lesser coverage will not have the desired impact on malaria and will mean wasting of valuable resources. All interior walls and ceilings should be covered in the spray. In addition to permanent human dwellings, jhum huts where people sleep during plantation and harvesting seasons should be sprayed. All human dwellings should be sprayed, but cattle sheds should not be sprayed, with a view to conserve insecticides; improve coverage of human dwellings; and prevent diversion of mosquitoes from cattle shed to human dwellings. It should be noted that the residual effect of insecticides is less on some surfaces, for example, porous mud walls, oil painted wood and alkaline white wash.

Safe insecticide management practices must be incorporated during IRS. A systematic effort is made to change people’s perception of IRS through IEC instead of enforcement.

The factors considered while selecting an insecticide for IRS include its availability, residual effectiveness, vector susceptibility and excito-repellency, cost and safety. The insecticides used for IRS under the malaria control programme are DDT, Malathion and a range of synthetic pyrethroids. Carbamate (Bendiocarb and Propoxur) formulations are also recommended by WHO for use for IRS but so far have not been included in the national programme due to field trials required.

The details of insecticides currently used in IRS and as larvicides are given in annex 9.

The IRS strategy for areas having perennial transmission or more than 5 months transmission in a year is 2 rounds of IRS with DDT/SP or 3 rounds with Malathion, depending on the vector susceptibility; and for areas having less than 5 months transmission in a year, have 1 round of IRS with DDT/ SP or Malathion before start of the transmission season, and focal spray whenever and wherever needed.

Spraying is a technical task and should be carried out by a properly trained workers only and should be properly supervised.

The technique to be followed in spray is given in detail in annex 10.

Supervision

An IRS operation organisation structure with clear terms of reference for each position, including a plan for supportive supervision and M&E system (for data collection and management) should be established and adapted by each State/UT implementing IRS. Supervision is an essential part of IRS to ensure its efficacy and safety. Supervision should be carried out by SPO, DVBDCO, AMO, MI and MO-PHC with laid down periodicity to identify the problems and take necessary action to resolve them.

During the supervision, spraying is checked to see whether it is being done correctly as per norms prescribed in the work manual. The condition of spray equipment, preparation of insecticide suspension, discharge rate, spray technique and speed should be checked. The consumption of insecticides should be verified by seeing the quantity issued and stock in hand. At the end of the visit, the supervisor should share the observations with the spray squads so that mistakes are not repeated in future. After the supervisory visits, the reports are sent to the districts for appropriate follow-up action.

6.3.2 LLINs

LLINs[8] have proven to be a practical and cost-effective intervention against malaria, and are highly effective against vector mosquitoes which bite indoors at night. They provide not only a physical barrier against the mosquito bites but also kill the mosquitoes or shorten their life span so that they cannot transmit malaria infection. However, for best effectiveness in the community, coverage of population at risk with LLINs must be as close to 100% as possible with high utilization rate (> 80%).

LLINs are manufactured based on two technologies: incorporation of the synthetic pyrethroid insecticide into the net's fibres or coating or impregnation of the insecticide on the fibre with a wash-resistant binder system. LLINs are designed for field use for a

[8] WHO recommendations for achieving universal coverage with long-lasting insecticidal nets in malaria control, September 2013 (revised March 2014)

minimum of 3 years but their effective life can vary depending on conditions of usage and maintenance, underscoring the need for ongoing field monitoring.

They are more sustainable than conventional ITNs which require repeated treatments. In addition to distribution to targeted high risk villages aiming for complete population coverage, additional LLINs should be given to pregnant women in high-risk areas and to special groups such as children in tribal schools and hostels.

Though the timing of LLIN distribution is less critical than IRS timing, for educational as well and logistical reasons, their optimal distribution time may be shortly before the start of the rainy season. Comprehensive health education campaign (Behavioural change communication) is necessary to, not only ensure high uptake, but also promote correct use and maintenance of LLINs.

Those involved in LLIN distribution should demonstrate the method of correct hanging of LLINs as well as how to use them for sleeping outdoors by tying them to four sticks.

WHO recommends universal coverage with LLINs for all people at risk of malaria. For mass campaigns, one LLIN should be distributed for every two persons at risk of malaria. However, for procurement purposes since many households have an odd number of members, the calculation needs to be adjusted when quantifying at the population level. Therefore, an overall ratio of 1 LLIN for every 1.8 persons in the target population should be used.

Mass distribution campaigns are a cost-effective way to rapidly achieve high and equitable coverage, but coverage gaps start to appear post-campaign through net deterioration, loss of nets, and population growth, requiring complementary continuous distribution channels. Mass campaigns should be repeated normally at an interval of no more than three years unless there is reliable observational evidence that a longer interval could be appropriate. Continuous distribution channels should be functional before, during, and after the mass distribution campaigns to avoid any gap in universal access to LLINs. There should also be efforts to improve LLINs and/or behaviour change interventions to improve net longevity and usage.

For monitoring whether universal coverage is being achieved, the basic survey indicators in use are:

- Percentage of households with at least one ITN/LLIN
- Percentage of population with access to an ITN/LLIN within the household
- Percentage of population reporting having slept last night under an ITN/LLIN
- Percentage of under-five children reporting having slept last night under an ITN/LLIN

Recent studies and surveys have revealed that the assumption of a uniform 3-year lifespan of LLINs may be over-optimistic and that the rate at which net coverage

declines after a campaign may be substantially more variable, and more rapid. WHO therefore now recommends that delivery of LLINs by immunization and antenatal services be given as much priority as delivery through periodic campaigns.

The lifespan of LLINs varies widely between individual nets and between settings, making it difficult to plan the rate or frequency at which replacement nets need to be procured and delivered. Therefore, it is imperative that the malaria program carries out LLIN durability monitoring. The three elements considered in assessing LLIN durability are net *survivorship, fabric integrity* and *insecticidal activity (bio-efficacy)*. These elements are determined partly by factors intrinsic to the net (e.g. material composition, knitting or weaving pattern, quality of finishing, insecticide type and content, additives, and technology) and partly by extrinsic factors that cause wear and tear.

Survivorship is the proportion of distributed nets still available for use as intended in the households to which they were given after a defined period, e.g. 1, 2, 3 or more years. Survivorship is inversely related to attrition which is the proportion of nets no longer in use. Attrition can be due to decay (e.g. destroyed, so torn and worn out that it is considered useless for protection against mosquitoes), absence (e.g. stolen, given away, moved) or used for other purposes. *Fabric integrity* reflects the number, location and size of holes in each net. The holes may be categorized as due to burn, tear, seam failure, nibbled or chewed by animals. *Insecticidal activity (bio-efficacy)* is the degree of knock-down, mortality or inhibition of blood-feeding induced in susceptible mosquitoes, as determined by standard WHO test procedures and criteria (i.e. cone bioassay, tunnel test).

As India plans to have long-term coverage with LLINs, information on the durability of different LLIN products in local settings is needed, for the following reasons:

- Need for knowing that products chosen for procurement are likely to perform better over time than others.
- Knowledge about the durability of LLINs after distribution is needed to estimate the necessary rate of replacement and the appropriate interval between campaigns.

Two main approaches are used to study LLIN durability[9]:

Prospective longitudinal studies in which nets are followed from the time of distribution and then followed at regular intervals. The main advantages of prospective studies is that it is easy to monitor loss of nets, as nets can be labelled with indelible markers; and they allow comparison of different LLINs on the basis of prior census. The disadvantage is that it is difficult to rule out the possibility of bias when a high proportion of nets are reported as having been given away or moved to other locations while still intact.

[9] The detailed methodology to carry out durability monitoring is given in the WHO publication “Guidelines for monitoring the durability of long-lasting insecticidal mosquito nets under operational conditions, 2011”

Retrospective, cross-sectional surveys to assess previously distributed nets in a representative sample of households. The main advantage is that they provide immediate information about previously-distributed nets, as long as there is accurate information about the age of those nets. However, the major disadvantage is that attrition is difficult to estimate unless there is accurate information on number of nets originally distributed to each household.

The steps for impregnation of bed nets is given in annex 11 and the logistics of LLINs in annex 12.

6.3.3 Larval source management (LSM)

Larval source management is the management of aquatic habitats (water bodies) that are potential larval habitats for mosquitoes, in order to prevent the completion of development of the immature stages. There are four types of LSM:

- *Habitat modification* is a permanent alteration to the environment, including landscaping, surface water drainage, filling and land reclamation, coverage of water storage containers with mosquito-proof lids or permanent slabs and coverage of the water surface with a material impenetrable to mosquitoes (e.g. expanded polystyrene beads).
- *Habitat manipulation* is a recurrent activity including water level manipulation (e.g. stream flushing, keeping drains clear of vegetation so that water can flow too fast to support mosquitoes).
- Larviciding is the regular application of biological or chemical insecticides to water bodies.
- Biological control is the introduction of natural predators into water bodies.

Larviciding measures should normally be used only as a supplement to the core interventions (LLINs or IRS); larviciding should never be seen as a substitute for LLINs or IRS in areas with significant malaria risk. Larviciding can be a useful supplement to core interventions only in some specific locations, where vectors tend to breed in permanent or semi-permanent water bodies that can be readily identified and accessed, i.e. breeding sites which are *'few, fixed and findable'*, and where the density of the human population to be protected is sufficiently high to justify the necessary resources. Larviciding is therefore potentially suitable as a supplement to core interventions in urban areas, but not in most rural areas where larval habitats are both numerous and unstable.

In areas where LSM is feasible, it can contribute to IVM by:

- LSM can supplement LLINs and IRS (which target indoor adult vector populations only) by controlling vectors that rest and bite outdoors.
- LSM can supplement LLINs and IRS to remove residual foci of malaria transmission in elimination programmes.

- Anopheline resistance has been reported to all four classes of insecticides used for IRS has been reported and among these synthetic pyrethroid is used in LLINs. The wide diversity of classes of larvicides, used in combination with habitat modification and manipulation, presents an opportunity to (i) reduce overall dependence on insecticides, (ii) preserve the efficacy of existing insecticides, and (iii) manage the spread of insecticide resistance once it has emerged.
- LSM can be adapted to target the vectors of other diseases, thereby improving cost-effectiveness, for example, the NVBDCP in India conducts LSM year-round in order to reduce the populations of vectors of dengue, filariasis and Japanese encephalitis in addition to the vectors of malaria.

6.3.4 Personal protective measures

Man mosquito contact can be reduced by use of mosquito nets while sleeping or by use of mosquito coils or mats. Mosquito repellents applied to skin give protection for 3 - 6 hours and are particularly useful for troops engaged in sentry duties and for those going outdoors from dusk to dawn for any other reason. Full sleeve shirts and trousers offer better protection from mosquito bites. Mosquito coils and mats usually take about 30 minutes to reach their maximum effectiveness and should be accordingly before the mosquitoes become active in the evenings.

The integrated approach of IVM addresses several disease with vector control tools, often in combination and synergistically; involves use of chemical and non-chemical methods; and integrates with other disease control methods, viz. drugs and vaccines.

Intersectoral partnerships for collaboration should be established at various levels, i.e., national, state, district, sub-district and village levels. Establishing formal collaboration between the health and other public sectors is an important step in increasing the participation of those sectors in vector control. All sectors should be strongly encouraged to conduct a health impact assessment of their activities to identify any risks for vector-borne disease, in order to reduce the risks. Some examples of role of intersectoral collaboration for IVM are:

- Irrigation management and certain agricultural practices could reduce vector breeding;
- Rural development programmes or construction projects could prevent vector breeding by adopting new standards or educating communities-
- Collaboration with agriculture and environment sectors could ensure coordinated, safe and judicious use of insecticides; and
- Community participation through IEC could improve peridomestic sanitation in urban areas targeting nuisance mosquitoes as well as disease vectors.

6.4 Environmental Management Plan (EMP)

The environmental management plan (EMP) consists of a set of mitigation, monitoring, capacity development and institutional measures to be taken during implementation and operation of the programme, to address the adverse environmental and social impacts, offset them, or reduce them to acceptable levels. NVBDCP recommends and supports the GoI in updating the various regulations such as Insecticides Act to meet minimum essential international standards and revision of the national guidelines on pesticides.

The EMP recommends a number of activities such as modification of specifications/contracts with insecticide producers to include guidelines for pesticide application and disposal of used bags/containers, measures for quality control and adequate labelling of products, including translation in local language of destination. The manufacturers should include instruction leaflets in local languages before dispatching the goods to destination. This will be one of the preconditions in the bidding document. Pre- and post-dispatch certification is necessary for all insecticide based products. Materials and quality of packaging by insecticide manufacturers shall be reviewed periodically by NVBDCP to ensure efficacy, shelf-life, human and environmental safety and manufacturers should provide independent certification of chemical and physical analysis, product and formulation acceptability to NVBDCP.

Safe transportation of insecticides requires trained drivers, well-labelled vehicles, checking of quality of packaging and pesticide load during transit and at point of delivery. A systematic tracking system of volumes of insecticide from factory to point of delivery needs to be established by the manufacturers, along with a system for reporting spills and leakages during transit. Safe and environmentally sound application of insecticides (space spraying and IRS, impregnation of bed nets, larviciding etc.) should be achieved by intensive training of all the spray workers and handlers and by timely availability of protective gear. Districts should have a review all spray equipment and protective gear before start of each spraying season and keep appropriate records. Close supervision of application activities is essential and district and PHC level officials should be provided adequate funds and training to ensure good practices are being followed. Manufacturers should be instructed to develop clear pictorial instructions to health and spray workers on use, application, preparation of suspension and disposal of insecticides, insecticide treated materials, insecticide containers etc.

Training of supervisory staff should cover topics on stock management; good storage practices; proper handling of pesticides during transport and disposal; application of insecticides; surveillance methods; signs and symptoms of poisoning, emergency measures; personal protective equipment usage; accident reporting, data management and monitoring and reporting.

A village level committee comprising of the village chief, AWW/ANM, junior health worker and village teacher could be constituted to supervise the proper storage, spraying and environment management including disposal of used containers etc. at subcentre/village. The community should also be educated to understand the importance of IRS and to take necessary steps to ensure maximum efficacy of spraying. Domestic and peridomestic sanitation may be an important component where individual and community cooperation is essential.

7. Epidemic Preparedness and Response

A malaria epidemic or outbreak is defined as the occurrence of malaria cases *highly in excess* of the number *expected* in a given place and time. While early detection and early response to a malaria outbreak is of paramount importance in all phases of malaria elimination, it will be critical in the prevention of re-establishment phase.

7.1 Factors Associated with Causation of Malaria Outbreaks

Malaria outbreaks are associated with two major environmental and climatic factors that have an impact on vectors and parasites and, poor access and coverage with key mix of essential interventions and what may be termed as program failure. This can be made worse with population movement. Information on the relevant factors should be collected from various departments like meteorology, construction industry, municipality, agriculture, transport, etc.

7.1.1 Environmental and climatic conditions

Climatic conditions have a profound effect on the life of a mosquito and on the development of the malaria parasite. The ideal ambient mean temperature for parasite development in the vector is 20^0-30^0C and minimum relative humidity for their survival is 60%. The mosquito breeding potential is related not only to the rainfall quantity but also to the timing, for example, early rainfall prior to the transmission season significantly increases the breeding potential in areas with seasonal malaria transmission. Therefore, the DVBDCO should collect data on temperature, humidity and rainfall on a weekly basis from the meteorology department. Semi-arid or desert areas also become malaria-prone because people here collect rain water and store it in tanks and open wells for domestic use. The pooling of seepage water along irrigation canals is also a fertile site for anopheline mosquito breeding. In India, there are many ecosystems in high-endemic areas with mosquito breeding supported by lakes, foothill rivulets of rain forests, and agricultural fields in deforested areas. Floods as well as drying river-beds both have outbreak potential due to mosquitogenic conditions.

7.1.2 Population movements

Mass movement of populations following disasters into poorly administered relief camps also create situations suitable for malaria outbreaks. Arrival of parasite carriers from high-endemic areas for development project work in low-endemic areas can also start a malaria epidemic with local vectors. The movement of non-immune populations to malaria endemic areas can also set up an outbreak. Migrant populations are more prone to start outbreaks due to their inadequate health seeking behaviour for diagnostic and treatment services because of ignorance and illiteracy, and also due to inadequate or improper use of bed nets.

7.1.3 Programme delivery factors

The programme delivery factors contributing to occurrence of outbreaks are:

- Poor access and coverage with combination of essential malaria interventions of all populations living in areas at risk of malaria
- Lack of access and coverage of households to community health workers/volunteers or access to health facilities such as subcentres, PHCs and hospitals
- Lack of two weekly treatment of larval breeding sites
- Lack of timely coverage of houses to IRS and three-yearly LLIN campaigns

7.1.4 Operational factors

The operational factors that may contribute to malaria outbreaks are:

- Inadequacy in number and/or skills of staff
- Lack of laboratory/diagnostic services
- Inadequate supply of antimalarial drugs, RDKs, LLINs, and insecticides, etc.
- Lack of transport

7.1.5 Technical factors

The following technical factors also may contribute to malaria outbreaks.

- Increases in mosquito breeding and density and man-mosquito contact
- Development of vector resistance to insecticides
- Development of parasite resistance to antimalarials
- Change in vector bionomics, i.e. resting and/or feeding habits of mosquito
- Change in mosquito vector species composition
- Decline in cattle availability (for zoonotic vector species)

7.2 Early Detection of Malaria Outbreaks

Malaria outbreak monitoring should be carried out on a weekly basis in all categories of areas in India and should be linked with the weekly reporting of outbreaks done by the IDSP. Current experience shows that regularly collected epidemiological data on malaria is not adequately analysed at peripheral levels for local action. The MO-PHC and DVBDCO can detect sharp increases in malaria incidence by analysis of village-wise data based on M-1 and M-4 forms. This will help in detection of impending epidemics for prompt response to be taken. An epidemic is also suspected, if there is suddenly a large number of confirmed malaria cases reporting to any health facility.

The warning signals for malaria outbreaks should be discussed in the weekly and monthly meetings of MO-PHCs of the district, in March in NE States, where the transmission season starts early and in May in other States and UTs. Each district and PHC should prepare a list of their high receptive areas and discuss in the monthly

meetings, the mechanism adopted for early detection of possible outbreaks in these areas.

7.2.1 Criteria for detection of epidemic by use of threshold graphs

The NVBDCP works in close association with the State Surveillance Units (SSU) and District Surveillance Units (DSU) of the Integrated Disease Surveillance Programme (IDSP). The IDSP collects data from subcentres, PHCs, CHCs, hospitals including government and private sector hospitals and medical colleges. The weekly data are analyzed by DSUs for disease trends and whenever there is rising trend, it is investigated by the RRTs to diagnose and control the outbreak. This section provides criteria that could be used to determine if an epidemic has started.

The expected level of malaria should be calculated from historical data excluding the past epidemic years. Four methods for calculating the weekly/monthly epidemic threshold level[10] are described below.

(a) Weekly/monthly mean for the past five years plus two standard deviations (SDs).
(b) Value of the second highest quartile, for the month/week over the past five years.
(c) C-SUM, which is the mean of previous, current and following month/weeks' data for the past five years.
(d) C-SUM refined by adding a 95% confidence interval (1.96 SD).

Each area should plot on graph all four methods to see which one would be most suitable for them, taking into account sensitivity, specificity and predictive value.

(a) Monthly/weekly mean of past five years plus two SDs

The alert threshold for each month/week is determined as the mean plus 2 SD as this should capture 95% of cases in normally distributed data.

(b) Upper third quartile

This method involves placing the values of the particular month/week for the past 5 years in a series - minimum value; second lowest; median value; second highest (upper third quartile); and highest value. If the current month/week's cases exceed second highest value of the past 5 years, it indicates that the epidemic threshold has been crossed.

Example

Let us say, we are interested in knowing if the cases (25 in number) occurring in a PHC area in June 2016 is above the threshold for an epidemic. Then, we will arrange the number of cases which occurred in June month of past 5 years: 2011 (17 cases); 2012 (20); 2013 (26); 2014 (22) and 2015 (21) in the order of minimum to maximum cases, i.e. 17, 20, 21, 22 and 26.

[10] Field guide for Malaria epidemic assessment and reporting; WHO/HTM/MAL/2004.1097

Since the cases which occur in June 2016, i.e. 25 in number is above the second highest of above five values, i.e. 22, it indicates that the epidemic threshold has been crossed in June 2016.

Similar calculations may be done on weekly data.

(c) Cumulative sum (C-SUM) method

The threshold number of cases for a month is calculated in C-SUM method by taking the average number of cases which occurred in the corresponding, previous and following months of past five years, e.g. the threshold number of cases for June 2016 would be the average of number of cases which occurred in May, June and July of each year from 2011 to 2015 (15 values). An advantage of this method is that it smoothens out artificial variations in monthly data due to late reporting or other errors in the surveillance system.

(d) C-SUM value plus 1.96 SDs

In this method, the value obtained in the C-SUM method is refined by adding 1.96 SDs.
The following information may also give indication of an impending outbreak:

- Increase in fever rate by one-third or more among new OPD cases
- Increased reporting of severe malaria cases at health facilities
- Increase in fever incidence in the population, as informed by MPHWs/ASHAs/any other health worker/volunteer
- Increase in malaria incidence as compared to incidence in corresponding month of previous years.
- Increase in TPR
- Increase in percentage of Pf cases, or proportion of gametocytes to other stages or malaria mortality
- Increase in consumption of antimalarials or non-response to antimalarials (drug resistance).

The above surveillance data and environmental conditions should be correlated with:

- Population dynamics such as influx of migrants from non-endemic to endemic areas and vice-versa, aggregation in development projects, labour movements to forest or for agriculture, irrigation, migration during floods and drought etc.
- Vector dynamics such as increase in vector density.

It is important to define and declare an epidemic at the earliest as this would bring in quick support, thus preventing avoidable morbidity and mortality and also wastage of resources. However, one should be careful not to declare a situation as an epidemic prematurely as this could lead to an over-reaction with wastage of scarce resources.

Fever alert surveillance for malaria has been integrated with the IDSP. Fever cases should be reported in the "weekly fever report" from PHCs to the district nodal officer of IDSP and DVBDCO. If an increase in fever incidence is observed, the IDSP nodal officer will send an alert to the DVBDCO and MO-PHC. Similarly, the DVBDCO will also inform the IDSP nodal officer of any increase in fever incidence.

If a strong degree of suspicion of an outbreak is raised, the following steps should be taken in the area:

- Conduct a rapid fever survey by blood smear examination / RDTs to find the TPR and assess the magnitude of malaria incidence
- Compare the TPR obtained in the rapid fever survey and TPR of the current month to the TPR of the corresponding month of previous year
- Compare the current year's month-wise malaria incidence to that of preceding three years.
- Collect information on epidemic supportive factors like climatic conditions, vulnerability, receptivity, vector density, etc. and endeavour to determine the cause-effect relationship.

An outbreak/epidemic is confirmed if there is doubling or > 5% increase in TPR in period under investigation compared to corresponding period of previous year. This would be supported by an increase in vector density and positivity in other supportive factors as discussed earlier. High TPR results should be confirmed by cross-checking of slides by an independent laboratory technician. Also, if the TPR is low but the fever rate is high, the quality of microscopy has to be cross-checked before declaring it as a non-malaria fever problem.

Malaria outbreaks usually occur in low transmission areas with unstable malaria. However, there have been instances in India where malaria epidemics have occurred even in areas where there is a perennial transmission of malaria. In India, with almost equal distribution of *P. vivax* and *P. falciparum* cases in some areas, it is understood that if an epidemic occurs in the beginning of the transmission season, it is likely to be a *P. vivax* malaria outbreak; and in the later part of the transmission season, a *P. falciparum* outbreak.

In the prevention of reintroduction phase, even a single case of malaria has a potential of focal outbreak. Immediate case-based surveillance has to be coupled with intensive monitoring to detect build-up of any outbreak.

DVBDCOs should possess entomological data based on past surveys and interpret the same for action. If no survey has been carried out in the district, request should be made for the same.

7.3 Response Mechanism

The districts should have their malaria epidemic plans in place and be fully prepared to respond rapidly to epidemics/outbreaks. The following are components of an effective response mechanism.

7.3.1 Rapid Response Teams (RRTs)

RRTs should work in collaboration with IDSP, with the aim of undertaking urgent epidemiological investigations, and provide on-the-spot technical guidance and logistic support. The RRT at the district level will comprise of an epidemiologist and entomologist from IDSP, laboratory technicians and other support staff. At CHC/PHC level, RRTs may comprise of the MO, health supervisor, laboratory technician, IRS squad, insect collector/field workers etc.

The main functions of the RRTs is rapid assessment and support for rapid response and includes the following:

- Rapid situation assessment
- Carry out health education activities and community mobilization to sensitize and motivate the community for active participation in epidemic investigations and control
- Support for deployment of mobile workers and community health workers/volunteers to conduct household screening and treatment and targeted mass drug administration as required
- Supervise implementation of repeated vector control measures and elimination of breeding places
- Emergency logistic support for extra vector control and diagnostic and drug supplies at community level and to health facilities
- Undertake epidemiological and entomological investigations and prepare outbreak reports

7.3.2 Logistics

The CMO/DVBDCO and the MO-PHC should ensure availability of adequate buffer stock of reagents, slides, RDTs, drugs, insecticides and spray equipment to take care of any possible requirement during outbreaks/epidemics in the transmission season. A contingency plan should be in place for mobilisation of resources. There should be a plan for referral and management of severe cases and adequate number of beds should be made available in the health facilities. In case of an anticipated shortage of beds, a plan to convert schools or panchayat buildings into wards should be in place.

When an outbreak/epidemic is suspected, MO-PHC or DVBDCO should immediately inform the RRT of the district, State and NVBDCP officials. Once an outbreak/epidemic is confirmed, the RRT should reach the area immediately. Adequate resources, logistics and manpower should be mobilised.

7.3.3 Delineation of the affected area

Once a malaria outbreak is confirmed in some villages of a PHC, the MO-PHC and DVBDCO will take action for delineation of the affected area and find out the extent and severity of the outbreak which will be depicted in maps. They will also inform the SPO immediately to help in the implementation of containment measures on a war-footing.

The area of the survey is expanded centrifugally from the centre of the epidemic till areas with normal positivity rates are reached. Thus the size of the area involved in the epidemic zone is delineated.

If the epidemic affected area is large, a rapid fever survey is conducted in affected villages with examination of blood smears of all fever cases and those with recent history of fever, and where microscopy is not possible, RDTs should be performed. Blood smears collected should be examined within 24 hours or alternately RDT should be used. If the affected population is relatively small, a mass survey of the entire population in the outbreak affected villages may be carried out by microscopy or RDT, irrespective of their fever status. All high-risk groups, i.e. children, pregnant women and migrants should be particularly covered in the surveys. Rational use of resources is important.

In areas close to PHCs, field laboratories should be established and fever cases screened with microscopy; and in areas far from the PHCs where microscopy is not possible, RDTs may be used. Maximum health staff from the PHC area should be pooled for blood smear collection/RDT examination to cover the entire target population as quickly as possible. If the extent and severity of the outbreak are large, field laboratories should be established by pooling laboratory technicians from adjoining PHCs, districts, zonal and State level laboratories. *The aim is to cover the entire target population within 10 days, and in no case taking more than a fortnight (i.e. within one extrinsic incubation period) so that secondary cases are prevented.*

All positive cases should be given radical treatment at the recommended doses according to the test result. If initial results indicate a TPR of 30% or above among fever cases, initiation of antimalarial treatment may be considered for all fever cases immediately after blood sample is collected for microscopy. In areas where initial investigations reveal that the outbreak is predominantly due to *P. falciparum* Malaria, treatment of fever cases may be started with ACT, even before the results arrive.

The next step in the exercise is to calculate the population size in the affected areas by taking the village-wise population from family registers maintained by MPHW (F) or the census population, whichever is readily available at the PHC. Having ascertained the population at risk and the number of households to be covered in the epidemic control measures, the following anti-vector measures should be undertaken.

7.3.4 Anti-vector measures

Indoor space spray with pyrethrum should be started as soon as survey results of a village are available without waiting for the survey to be completed in the entire area. As results from other villages become available, all affected villages will be covered with space sprays. Every house in affected villages should be covered. Space spray should be continued for 7 to 10 consecutive days, preferably in early morning or evening hours and till IRS in all houses in the locality is completed.

The formulation for space spray is prepared by diluting 1 litre of pyrethrum 2% extract with 19 litres of kerosene oil. Spray is done with a hand-operated micro-discharge fogging machine or hand-operated atomizer (e.g. flit pump) at the rate of 15-30 cc per 30 cubic metres of space with all doors, windows and other openings closed.

IRS should be started simultaneously with indoor space spray using the insecticide to which the local vector is susceptible as per available information. It is useful to collect live adults (or larvae) before the spray for conducting insecticide resistance tests.

The zonal officer should depute the zonal entomological team to carry out vector density studies and report the findings to the RRT. Prolific breeding sites will be identified (e.g. water storage tanks, peridomestic water collections, or well-delimited water bodies in arid areas) and appropriate antilarval measures instituted immediately. Studies will also be started to assess the susceptibility of local vector(s) to various insecticides in use.

7.3.5 Follow-up action

The follow-up actions given below are undertaken to assess the impact of remedial measures taken.

- Close surveillance is continued for one month (twice the incubation period) after the outbreak has been contained as indicated by epidemiological indices
- Case detection and treatment services will be strengthened at all levels in the vicinity by ensuring that laboratories are fully functional; surveillance workers are deployed; ASHAs and CHVs are activated; and supplies at all levels are ensured.
- Epidemiological investigation is carried out to pin-point the cause of the epidemic which may be, for example:
  - Arrival of migrant labour in project areas not covered by screening at entry or surveillance or case management
  - Breakdown of malaria control operations
  - Natural calamities such as floods, heavy rains, drought leading to establishment of relief camps for migrant populations lacking vector control measures

7.3.6 Outcome indicators

The following outcome indicators help in assessing if the interventions for control of epidemics were able to achieve their aims, i.e. reduction in morbidity, mortality, and transmission.

- *Delay in reporting for treatment.* The time of onset of symptoms and reporting for treatment are recorded in the registration book. Early reporting gives an indication of the success of the awareness campaign as well as the confidence people have in the health system and workers.
- *Proportion of cases developing severe disease.* This proportion gives a good indication of effectiveness of treatment of uncomplicated malaria cases.
- *Case fatality rate (CFR).* CFR indicates the quality of in-patient care in hospitals, but the indicator may also be high due to late referral or late arrival of patients.
- *Flattening or falling epidemic curve.* Epidemics which are not controlled well normally continue till about 50% of the population at risk have been infected, or until cooler weather conditions start to limit transmission. If the epidemic is identified early, or at least before its peak, the control measures should be able to prevent such a large extent of population getting infected.

7.3.7 Reporting

As soon as an epidemic is suspected, the MO-PHC / DVBDCO should inform telephonically or via email the SPO, the Regional Director, ROH&FW and Director, NVBDCP and immediately after the epidemic is confirmed. The reports of follow-up action and rapid fever survey / mass survey should also be sent. The epidemic control proforma, including the spray completion report and epidemiological investigation report will be signed by the MO-PHC/DVBDCO/RRT and sent to the SPO with copies to ROH&FW and Directorate of NVBDCP.

An analytic summary of these reports is prepared by DVBDCO one month after all the operations are completed. The final report is prepared, bringing out details of epidemiological investigation done, control strategy adopted, lessons learnt, etc. This should be circulated to other districts and states, which will help their programme officers to be fully prepared to deal with such situations. The report should be included in the annual reports on malaria from the district and State also uploaded on the NVBDCP website.

The epidemic control proforma of list of villages within the malaria epidemic zone, list of villages within the malaria epidemic zone, epidemiological investigation report of malaria outbreak, final report on malaria outbreak and its control, and investigation report of deaths and details of mass survey and IRS are given in annex 13.

7.5 Containment of Malaria in Camps

Natural calamities and civil disturbances often lead to establishment of relief and rehabilitation camps which aggregate populations from areas of varying malaria endemicity. The population may be sheltered either in permanent buildings like schools, community halls etc. or in tents erected specifically for this purpose. The vulnerability of these populations is increased by inadequate infrastructure (mainly shelter, water supply and sanitation) in the camps.

7.5.1 Surveillance and case management

A clinic should be established in the camp catering to the detection and treatment of malaria and other VBDs as part of general health services provided. All fever cases or cases with recent history of fever should be tested for malaria by microscopy or RDTs and positive cases given the appropriate radical treatment. Severe malaria cases should be identified early and referred to the nearest health facility which has the capability to treat such cases. The daily and weekly epidemiological report of malaria should be concerned authorities for necessary public health action to be taken. In case of an outbreak occurring in the camp, containment measures as described earlier in the section should be instituted.

7.5.2 Vector control

A survey is carried out to find out all mosquito breeding sites nearby and potential breeding places. Source reduction must be undertaken by covering water containers, filling the pits and properly channelizing the water bodies. Anti-larval spray should be carried out at weekly intervals in and around the camps. Surveys may be carried out to find out the vector species in the area and the vector density.

As an immediate intervention to kill mosquito vectors, space spray with 0.1% pyrethrum solution should be done followed by one round of IRS with DDT/SP in permanent buildings. Arrangements should also be made for issue and use of ITNs/LLINs and repellents and barrier creams.

7.5.3 IEC / BCC

The camp residents should be made aware through inter-personal communication and public address systems regarding action to be taken by them for prevention and control of malaria. Awareness should be created about mode of transmission of malaria and other VBDs; availability of diagnostic and treatment facilities in the camp and need to promptly utilise the facilities in case of onset of fever; importance of using ITNs/LLINs and other personal protection measures; and importance of proper waste management and sanitation in general. *For details on the appropriate media and messages for IEC/BCC, refer to the chapter on "community participation and behaviour change communication' and also the annex on "antimalaria month".*

8. Malaria in Special Groups and Situations

8.1 Introduction

Malaria is a disease with varying levels of influence in different eco-environmental situations and also presenting diverse complexity according to the population groups affected. In India, malaria control and elimination imposes special challenges in populations living in, for example, forest regions, forest-fringe areas and urban and peri-urban areas. Special efforts are also required in populations working in development projects and agriculture. Situations such as natural disasters including floods and drought, and socio-political disturbances create additional dimensions to malaria control.

8.2 Forest Malaria

Forests and settlements in recently deforested areas in India are known to harbour very efficient malaria vectors. These vectors bite humans in their shelters, but return to rest in the forest, avoiding residual insecticides sprayed indoors in the shelters. Malaria transmission is therefore more intense and more difficult to control in temporary or newly established forest settlements.

In many forest areas, groups engaged in socio-political revolt or illegal activities are out of reach of the government health system but may be in contact with rest of the population and be part of the malaria eco-epidemiological system. The manner of instituting malaria control measures in these populations with help of local mediators should be explored.

Attention must also be given to international borders running across forests, permitting movement of migrant parasite carrying labour from high-endemic areas. This requires cross-border or regional initiatives to manage malaria transmission across the national boundaries.

Police and army posts in forest areas are often manned by people on temporary assignment who may require chemoprophylaxis, decision on which is taken by their medical administrative authorities.

8.3 Forest-fringe Areas

The malaria incidence is high in recently deforested areas of many high-endemic States in India. The erstwhile forests get converted into agricultural land and the workers stay in the land for 3-4 months at a time for what is known as jhum cultivation, living in temporary shelter getting exposed to bites by very efficient mosquito vectors. These workers should be issued with LLINs and with BCC efforts to ensure their use. They should be also advised to wear adequate clothing to protect themselves from mosquito bites.

8.4 Agricultural Projects

There is adequate potential for water management in agricultural fields, especially rice fields, where intermittent or rotational (alternate wet and dry) irrigation can be practised. Intersectoral collaboration should be established with authorities from agriculture and irrigation sectors, and also the farming community for implementation of source reduction by water or land management and other appropriate engineering measures; and also for training on integrated pest management and IVM through farmer field schools.

8.5 Project Malaria

The migrant population movement into areas where construction or other developmental projects are ongoing, is fraught with two types of risks. Firstly, the situation may bring parasite carriers from high malaria endemic areas to areas with low/no transmission but with potentially efficient vectors; and secondly immunologically naïve workers from non-endemic areas may come to high-risk endemic areas. Both these situations could lead to malaria outbreaks if adequate surveillance and vector control measures are not implemented. If the project is located in a high endemic area, special attention should be paid to labour coming from non-endemic areas with a high level of surveillance and adequate personal protection supplemented by vector control measures.

Whenever any major development project, particularly irrigation project, is planned, the SPO/DVBDCO should be involved in conducting a health impact assessment survey including an assessment of the project's potential to increase vector breeding, so that control measures are built into the plan, including budgetary provisions.

In the case of minor projects with small numbers of labour, health coverage can be given by the staff of the PHC. However, major projects need a separate set-up with staff for implementation of malaria control activities including surveillance and screening of workers for malaria and for vector control measures. The staffing should include a medical officer, laboratory technician and malaria inspector.

All incoming labour and their families coming from malaria endemic areas entering the project area should be screened for malaria by performing RDT and / or taking blood smears, followed by treatment as appropriate. If health workers are not available, volunteers from the project staff should be trained to perform RDT, collect blood smears and administer malaria treatment. If the project set up has a laboratory technician, slides should be examined and reported within 24 hours. A referral hospital should also be identified to transfer severe malaria cases for their further management.

Weekly inspections of the project area and its surroundings should be made for detecting mosquito breeding sites. Environmental measures for water management like drainage, filling and levelling of water bodies should be undertaken, wherever possible. Weekly anti-larval measures with chemical larvicides or biocides will be done where applicable.

Based on the DVBDCO's advice, IRS will be carried out with the appropriate insecticide in all buildings and hutments. Adequate number of superior field workers and field workers should be employed for antilarval work and IRS sprays according to the project area and its population. Insecticides and larvicides should be supplied by State VBDCP and if purchased by project authorities, the scale of supplies should be calculated as per laid down norms. The project authorities are required to send monthly reports on malaria control activities regularly to the concerned DVBDCO/SPO.

8.6 Urban and Peri-urban Areas

An. stephensi is the main urban malaria vector adapted to breeding in wells, cisterns, roof gutters, tanks and all kinds of containers in many Indian cities. As the cities and towns have expanded as part of urbanization across the country, the area of influence of the vector has also expanded. The vector has the potential to cause outbreaks in many locations, particularly slums and construction sites, with water collections. Larval control is particularly indicated in urban and peri-urban areas, where most breeding places are man-made and can be identified, mapped and treated. Domestic and peri-domestic sanitation is an important component of larval control which requires community cooperation and participation. Larval control in urban and urban areas often requires legislation and enforcement, and equally importantly public information and education.

8.7 Cross-border Malaria

Malaria parasite infected people and mosquitoes move freely between malaria affected and malaria free areas, often crossing international borders without impediment. With the focus shifting towards malaria elimination the need for regional cross border malaria initiatives has become of paramount importance in ensuring the risk of parasite importation is greatly reduced. The primary focus of cross border malaria control is to reach and provide access to key malaria interventions to hard-to-reach populations, disadvantaged ethnic groups, refugees, migrants and travellers in border areas.

Health system and disease control organization, administrative procedures and disease prevention and treatment protocols differ from country to country. For any regional approach to succeed it is essential that there is harmonisation and standardisation of all procedures and protocols.

The goal in cross-border malaria control is to reduce malaria transmission in border areas and minimize the movement of malaria infected people and vectors across-borders.

The key strategies for cross-border malaria control are:

- Harmonization of malaria policies such as insecticides used for IRS and use of LLINs, RDTs and ACT and other drugs used;
- Common IEC/BCC messaging;

- Support for cross-border referral of severe cases;
- Regular sharing of surveillance data and early warning on potential epidemics; and
- Sharing of technical expertise and other resources to support service delivery.

The schedule for intervention implementation is planned during annual joint border district planning meetings with quarterly and annual review meetings held for reporting on progress and performance and coordination purposes.

The broad objectives are to share information, coordinate, harmonize and synchronize malaria intervention policies, strategies, annual work plans and activities in affected areas on both sides of a common border to reduce the export and import of malaria vectors and parasites. For these objectives to be realised there must be universal access to and high coverage of an integrated package of malaria interventions, where all malaria infections (locally acquired and/or imported) are timely detected and effectively treated. The onward transmission of malaria parasites through infected vectors is markedly reduced or prevented through integrated vector control approach and through infected people is thorough ACD and PCD for repeated screening, treatment and cure.

8.8 Floods and Malaria

Floods may lead to a rise in incidence of VBDs through the increase in the number and range of vector habitats. Flooding may initially flush out mosquito breeding, but later result in pools of water creating mosquitogenic conditions. The lag time between the floods and possible malaria epidemics is estimated to be around 6-8 weeks. The risk of outbreaks is greatly increased by other factors, such as people sleeping outdoors, temporary laxity in disease control activities and overcrowding. Malaria control programme personnel should scale up surveillance and vector control activities to prevent outbreaks.

8.9 Drought and Malaria

During drought situations, most rivers dry up resulting in slow moving rivulets and pools creating ideal conditions for mosquito breeding. In addition, the death of many animals may cause diversion of zoophilic mosquito species to bite to human beings. Scale-up of all malaria control measures is mandatory to combat this increased malariogenic situation.

8.10 Socio-civil Disturbances

Socio-civil disturbances often result in refugee situations where they are more often than not housed in shelters without much of infrastructure. Such populations have a high risk of exposure to mosquito bites due to the poor environmental conditions around allowing mosquito breeding. *Prevention and control measures are same as those already described under 'Containment of malaria in camps' in the chapter on "epidemic preparedness and response".*

8.11 Malaria in Tribal Areas

There 152 districts in the country having a tribal population of 25%. These districts comprise about 5% of total population and 31% of total ST population of the country. In 2012, these districts contributed 44% of country's total malaria cases, 68% *Plasmodium falciparum* cases and 43% deaths due to malaria.

The malaria problem in tribal areas need special attention on account of one of the most important cause of morbidity and mortality a. Large sections of tribal population live in inaccessible terrains, forest, hilly and riverbed conditions, and charaterized by high degree of mobility, poverty, inadequate clothing, outdoor sleeping habits, forest based economy etc. Presence of efficient vectors, triple insecticide resistance and innumerous breeding sites add to the problem. Moreover, health infrastructure is generally found to be inadequate in these areas. All these factors maintain malaria as one of the most important cause of morbidity and mortality affecting tribal populations. The predominant parasite species in tribal areas is P*. falciparum* which is known to cause severity and lead to mortality if timely treatment is not provided. Asymptomatic reservoir is also prevalent in such areas. The shortfall in trained manpower, supplies and transport further worsen these complexities.

Only routine strategies and their implementation may not give the desired impact in tribal areas. Therefore, a specific strategy for Tribal Malaria is needed. A tribal-specific strategy is being envisaged to be implemented through a Tribal Malaria Action Plan (TMAP). The services under the TMAP will be provided through local partners in a measurable and sustainable manner. The plan also envisages flexibility to utilize resources from one district to another, as needed. The TMAP model is expected to bring down malaria in hot-spots and will ensure better health management for tribal populations. District-wise analysis shows that out of the 152 Tribal Districts (Tribal population more than 25%), 96 districts have an Annual Parasite Incidence or slide positivity rate more than 1.

Under the TMAP, category 2 and 3 districts are planned to be covered initially. This will enable concentration of available resources to high endemic areas and their maximum utilisation. Thereafter similar inputs can also be rolled out in other tribal districts as well as non tribal high malaria endemic districts. The District Collector to be administratively responsible for coordination. Following key interventions are envisaged.

- Strengthening surveillance. Introduction of mobile-based surveillance, where routine health services/facilities are not available.
- Provision of hamlet-wise ASHAs instead of village-wise.
- Wherever engagement of ASHAs is not possible, Anganwadi Workers of ICDS, faith healers, local medical/ health care providers, village headmen, PRIs or school teachers may be trained and provided relevant logistics to diagnose and treat malaria cases. In forest areas, involvement of forest department in diagnosis and treatment may be done.

- In LWE areas (civic disturbance), provision of well-informed and pre-scheduled mobile health services.
- Involvement of locally available, credible NGOs.
- Strengthening of PHCs with quality microscopy facilities.
- Provision of diagnosis and treatment facilities by contractors/owners of development projects to the labours on site, should be made mandatory.
- On the spot, species-specific radical treatment of all positive cases of malaria.
- Identification of serious cases and early referral to specialized health facilities, ensuring free transport services.
- Follow up and epidemiological tracking of all positive cases.
- Mass screening of migrants and wherever necessary.
- Integrated Vector Management (IVM) for appropriate vector control. Prioritization of villages according to degree of risk for taking appropriate vector control measures (IRS/ LLINs or treatment of community-owned bed nets with insecticides)
- Social marketing to increase usage of bed nets.
- 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.
- Regular and efficient supply chain management.
- Intensive training for all cadres of staff, ASHAs/community volunteers.
- Community mobilization by utilizing traditional IEC/BCC tools and practices.

8.11.1 Vulnerable Communities Plan (VCP)

For quality implementation of programme activities, the safeguard issues related to community should continue to be given due importance especially in all categories. A 'Vulnerable Community Plan' has been developed by NVBDCP and should continue to be relevant to safeguard the interests of vulnerable population.

The term 'vulnerable community' includes the groups of people with social, cultural, economic and/or political traditions and institutions distinct from the mainstream or dominant society that disadvantage them in the development process. 'Indigenous people' known as 'Scheduled Tribes' (ST) or 'tribal groups' in India are recognized as vulnerable communities, and so too are the 'Scheduled Castes' (SCs) and economically poor ('Below Poverty Line' or BPL), including those among minority religions.

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. The NHM seeks to improve access to health care by strengthening the public health system, notably with a village-based worker known as the ASHA, greater engagement of the private sector, and increased and flexible finances. It also seeks to enhance community demand for and ownership of services, and coordinated planning and implementation across related sectors such as Departments of Women and Child Development and Tribal Affairs, amongst others.

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 NHM has enhanced the ability of local panchayats to address local needs and priorities to improve health by providing untied funds to Village Health, Sanitation and Nutrition Committees (VHSNCs). 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 and should continue to be visualized for community participation in timely and quality healthcare delivery.

Framework for consultations with vulnerable communities

The framework for consultations with tribal people and other vulnerable communities is presented in Table. It indicates the possible facilitators at different levels, methods to be used and frequency of consultations. These consultations are expected to give 'real time', experience-based feedback from community/clients, local leaders, staff and NGOs/FBOs/CBOs on how the programme is functioning in tribal areas and/or for vulnerable communities, including suggestions for improvement of any aspect of the program. They will also contribute to the design and implementation of BCC efforts, operational pilots and NGO involvement, to help ensure need- and demand-based, culturally-acceptable approaches, plans and service delivery.

Table 8.1 : Framework for consultations with vulnerable communities during programme implementation

Level	Facilitator	Methods	Frequency
Village level	VHSNC/ASHA/CHV, HW with NGO	Community meeting and key client visits	Once in three months
Subcentre and Additional PHC	HW, MTS/MO-PHC with NGO	Staff meeting, community meeting and key client visits	Once in six months
Block PHC and CHC	DMO, District VBD Officer, Consultants, experts, NGO	Meeting with staff, panchayats, key client visits	Once in six months
District	DMO, District VBD Officer/Consultants, experts, NGO	Workshop with key stakeholders (including Village Head/tribal council Chief, PRIs, NGOs)	Annually
State	SPO, Consultants, experts, NGO, NVBDCP	Workshop with key stakeholders	Annually
National	NVBDCP	Workshop with key stakeholders	Annually

Note: the VCP should continue to discussed and reviewed during monthly and quarterly meetings at sub national levels.

Action plan

Most of the category 3 and 2 areas (and certain pockets in category 1 districts) are tribal or backward, and many of its intended beneficiaries are tribal or other vulnerable people, so intervention strategies in these areas are designed to address the constraints faced in these areas and by these people in prevention, diagnosis and treatment of malaria. The strategies include supply-side improvements; increasing access according to need; communication for demand-generation, informed decision-making and improved practices; socio-culturally appropriate and gender-sensitive planning and implementation; and monitoring by dedicated VBD staff/experts. The consultations at the community/client and sub-district levels of the health system should focus on whether the program is reaching vulnerable groups, and cover all aspects of service delivery related to this project, including the cultural acceptability of interventions, BCC activities and grievance redressal mechanisms. At district level and above, the consultations should focus on whether tribal people and the most backward areas are receiving due attention in all aspects of program planning, management and implementation, including capacity-building and monitoring of private providers; and monitoring by panchayats. In all category 3 and 2 districts (and certain pockets in category 1 districts), the VCP should primarily be the responsibility of the District VBDCP. This team should coordinate with the sub-district levels, and report on progress, constraints and resource requirements to the state VBDCP.

Capacity enhancement: To build the knowledge and skills to implement and manage the VCP, the curriculum and modules should be revised to include topics such as: socio-cultural (including gender) issues; the political and self-governance structures of vulnerable communities, their rights and policies; methods to assess and address their needs and priorities; approaches to achieve and sustain vulnerable communities' access to malaria elimination services and products and so on. Advoicacy, BCC, community mobilization, counseling and motivation skills should be stressed. Training on the VCP should be integrated into the overall NVBDCP training. A database of experts with social science background and knowledge of tribal people and other vulnerable communities should be developed to ensure the availability of appropriate trainers and technical resources.

The VCP should address any unintended or unforeseen effects of the programme that may increase peoples' vulnerability to malaria and elimination operations. The potential adverse impacts could be related to vector management or case management and include insecticide resistance, drug resistance, poor health and environmental contamination caused by improper use, handling, storage etc. of prevention/treatment items. The program should ensure mitigation of such risks.

In addition, micro-planning of all interventions should be undertaken at the district level to ensure that local needs are addressed appropriately. Health volunteers, PRIs, tribal councils and other NGOs, FBOs, CBOs and even corporate sector should be

sensitized to participate in planning and implementation, and take responsibility for monitoring vector control, treatment interventions and effects. Advocacy, inter-sectoral and BCC activities should be targeted to make the affected and surrounding communities aware of the causes and methods of malaria prevention, diagnosis and treatment options, and to stimulate appropriate behavioral responses. The BCC should also build on the potential adverse consequences of use, non-use and improper use of drugs and insecticides. Capacity building, supervision and monitoring activities planned under programme should also help to avoid, minimize, mitigate or compensate for adverse effects.

In view of the specific needs of such areas, the programme should establish systems to bring out and redress grievances related to the lack of access to or availability of curative and preventive services and information. Within the health system, cases and outbreaks, stock-outs of drugs, backlogs of unexamined blood slides, unavailability of bed-nets, poor coverage and quality of insecticide spraying, inadequate biological control, inadequate/ineffective advicacy, inter-sectoral coordination, BCC activities, and so on, will be reported upward from village to sub-district, district, state and national levels. In addition to this internal monitoring and reporting, individuals, community volunteers (such as ASHAs, AWWs), local self-government (VHSCs/PRIs/tribal councils), NGOs/FBOs/CBOs, the autonomous societies managing health facilities (Rogi Kalyan Samitis), and district and state Societies should be able to express their grievances through a variety of means. Tribal and other vulnerable community representatives should be included in stakeholder committees to recognize and address issues. Contact information of core program/project staff (such as telephone/mobile phone numbers and addresses for postcards/written communication) should be provided at the community level.

9. Human Resource and Capacity Building

The success of the malaria control programme depends on having a full complement of competent workforce. Regular staff are required for continuity of the programme while contractual staff may be required to achieve specific objectives in time-bound projects within the programme.

The regular staff involved in the malaria programme at various levels of the health system are as follows:

- National
    - Director
    - Additional Directors
    - Joint Directors
    - Deputy/Assistant/Deputy Assistant Directors
    - Research Officers
    - Other staff: Administration, Accounts, Estate, etc.
- Regional
    - Regional Director
    - Entomologists
    - Other entomology staff
- State
    - State Programme Officer (for VBDs)
    - Deputy Directors
    - Entomologists
    - Secretarial and other staff
- District
    - District VBD Control Officer
    - Malaria inspectors
    - Support staff
- Sub-district level and below
    - MO-PHC
    - Other health staff

The contractual deployed for malaria program activities at various levels are as follows:

- National
    - National consultants (M&E; finance; procurement; training; vector control; and IEC/BCC)
    - Statisticians
    - Computer programmers
    - Data entry operators/Secretarial assistants
    - Office assistants

- Regional
    - Medical officer
    - Entomologists and other entomology staff
- State
    - State consultants (M&E; public health; finance; procurement; IEC/BCC; and training)
    - Account-cum-statistical assistant (1 per state)
    - Secretarial assistant (1 per state)
- District
    - District VBD consultants (1 per district)
    - Secretarial assistant-cum-Data entry operator (1 per district)
- Sub-district
    - VBD Technical supervisor (1 per block)
    - Laboratory technicians

In addition, all efforts are being made to ensure that 1 MPHW (Male) is posted at each subcentre across the country by filling existing vacancies and also create posts so that all subcentres have MPHWs. Similarly efforts are being made to ensure that microscopy facilities and laboratory technicians are available at all PHCs.

There are also plans to restructure the Directorate of NVBDCP at the headquarter level to meet the requirements of the malaria elimination initiative. About 100 regional coordinators are being planned, with each one performing independent monitoring of about 6-7 districts. It is also proposed to have one sentinel site in each category 2 and 3 district.

Capacity building should be aimed at keeping staff at all levels abreast with latest policies and guidelines and improving their skills. The change of strategy from malaria control to malaria elimination requires fresh re-training of the various categories of staff at different levels of service delivery. The learning aimed at acquiring new knowledge and skills needs use of interactive tools like modular trainings, case studies, field exercises apart from lecture-cum-demonstrations. Trainers should act as facilitators, guiding participants to knowledge rather than just supplying them with facts. Group discussions should be mandatory along with project work for individuals.

Induction training is aimed at giving a broad overview of the program to enable newly recruited staff to become productive as quickly as possible. Refresher training should focus on current issues and help in promoting individual competencies and thus organizational performance. The matrix on training needs under NVBDCP is given in table below.

Table 9.1. Training matrix under NVBDCP for various categories of staff

Level	Participants	Location	Duration	No. per batch	Responsibility
District, State, Regional	ASHA, AWW, CHV	CHC/PHC	2 days	25	MO-CHC/PHC
	Traditional/faith healers	CHC/PHC	1 day	25	MO-CHC/PHC
	MPHS, MPHW, ANM	CHC	3 days	25	MO-CHC/PHC
	LT	District/ State/ ROH&FW laboratory	Induction: 24 days; reorientation: 10 days, once in 2-3 years	20	MO in charge of District/State/ROH &FW laboratory
	MO-PHC	District	3 days	25	District/Regional training centres
	Physicians of government & private hospitals, and NGOs	Regional	2 days	25	Medical college
	MTS	Sub-national	Induction: 10 days; reorientation: 5 days, once in 2 years	25	VCRC/NIMR and its field stations/ selected ICMR institutions
	Private practitioners	District	½ day	10	DVBDCO/IMA/Private sector/SPO
	Zonal entomologists	Sub-national/ State	4 weeks	15	VCRC/NIMR and its field stations
National	DVBDCOs	National/ sub-national	5 days	25	NVBDCP, NIMR and management institutes
	VBD consultants	National/ sub-national	3 months	25	NVBDCP, NIMR and Management institutes
	SPOs, Officers of Regional Office, entomologists	National	5 days	20	NVBDCP, NIMR and management institutes

Planning for training in a district

Training of MO-PHCs, MPHWs and ASHAs are included with the NHM integrated trainings. However, additional programme-specific trainings as indicated in table above are needed to be planned and imparted separately. Special trainings are also given on NAMMIS for State and district level staff and on LQAS surveys to the MTSs and district VBD consultants.

The estimation of training load is to be done at the beginning of the year. This should consider the number of personnel sanctioned and in position at different levels. The status of training undergone so far by the personnel should be kept in mind for calculating the requirements of the number of personnel to be trained and batches of trainings to be conducted.

Monitoring and evaluation of training

Pre- and post- test evaluation of the trainees should be part of the training courses. Feedback on quality of training, as well suggestions for improvement should be obtained from the participants at the end of each session. Concurrent evaluation of the trainings should be done by independent observers. SPOs would be required to submit quarterly progress reports on training as per formats given in the M & E framework. The report should reach the Directorate of NVBDCP on or before 20th of the succeeding month of the quarter.

10. Health System Strengthening

10.1 Introduction

Achieving malaria elimination is inextricably linked to all the building blocks of health system strengthening, namely service delivery; health workforce; health information systems; access to essential medicines; financing and stewardship/ governance.

The health system challenges which retard progress towards malaria elimination include weak supply chains and unregulated private health sector allowing use of ineffective antimalarial medicines or vector control products; weak systems for surveillance, monitoring and evaluation, which compromise the ability to track gaps in programme coverage and changes in disease burden; lack of adequate human resource capacities to sustain and scale up efforts; and the poor access to health services for hard-to-reach populations and rural communities.

Substantial investments are needed to strengthen health systems, particularly basic health infrastructures, commodity-delivery systems, pharmaceutical regulation, human resources, and vital registration systems. Strong collaboration between malaria programmes and other health programmes – such as reproductive health, maternal and child programmes, laboratory services and regulatory authorities (for diagnostic devices, medicines and insecticides) – is also essential for the successful implementation of malaria elimination programme.

10.2 Health Workforce and Malaria Expert Base

The malaria programme operates in a complex environment, with a continuous need to adjust responses in line with outbreaks and resurgences, changing transmission patterns, and development of drug and insecticide resistance. Robust expansion of malaria interventions requires significantly expanded human resource capacities at national, district and community levels. The education, training and motivation of health workers, programme staff and malaria researchers –including adequate mentoring, supervision, and compensation – is the key to ensuring programme effectiveness.

10.3 Community-based Diagnostic Testing and Treatment

Training and deployment of community health workers and volunteers can substantially complement and extend the reach of public health services, particularly in rural and remote areas, where health infrastructures are weak and malaria transmission the highest. The strategic use of community health workers and ASHAs in malaria prevention and care not only bridges health system gaps, but ensures a continuum of care for the most disadvantaged populations.

10.4 Strengthen Capacity for Vector Control

For effective delivery and monitoring of vector control interventions, there is a need to invest in human resources and organizational and infrastructural development that will boost capacity to generate and analyze essential data. A long-term strategic plan should be developed for building sustainable human resource capacity and establishing career structures and systems to ensure optimal delivery of vector control interventions.

10.5 Information Systems

Routine information systems are crucial for malaria surveillance at all phases. Sufficient investments must be made in the management and use of data to generate the information needed for programme planning, implementation and evaluation. Adequate financial and logistical support is needed for provision of office supplies and equipment, training and retraining of staff, supervision of health facilities, and communications. Building the technical capacity of staff for data analysis and interpretation is the overriding need in order to enable the malaria elimination programme to use surveillance information most effectively.

10.6 Access to Essential Medicines and Commodities

A stronger focus on improved supply chains for quality-assured diagnostics, medicines and vector control tools, well planned procurement, the harnessing of new technologies for data collection and management, and better regulation and oversight of the activities of private sector pharmaceutical vendors are all crucial to making systemic improvements. High-quality and efficient provision of malaria prevention and care – in both the public and private health sectors – will benefit from, and help to build, stronger health systems.

10.7 Increase International and Domestic Financing

As malaria programmes in States/UTs reduce transmission to very low rates, the focus will shift from preventing, detecting and treating clinical cases to preventing, detecting and treating every malaria infection. This change requires strengthened and sustained epidemiological and entomological surveillance systems, a requirement that can be satisfied only through substantial long-term financial and political commitment as well as significant structural and organizational changes in malaria programmes. There is a need for increase in domestic resources directed to strengthening health systems. New financing solutions should be conceived to tap into emerging development financing and private sector resources.

10.8 Governance / Stewardship

Given the large number of stakeholders and the important role in the malaria programme of development partners, private industry, research and academia, private sector health facilities, nongovernmental organizations and community health workers, the national public health programmes should improve their overall coordination of the work on malaria.

10.9 Private Sector Participation

The private health sector, including industry, health facilities and other actors, has a vital role in the development and delivery of commodities and services, for instance through the development of new tools and interventions and bringing them to market. A stronger engagement will be essential to improve the quality of interventions, including formal and informal private sector provision of patient care and the appropriate reporting to the national surveillance systems of all malaria cases, treatment outcomes and deaths. These partnerships can also play an important role in protecting workers who are recruited for major development projects and treating those who become infected.

10.10 Empower Communities and Engage with NGOs

Integrated, people-centred, community services are needed, and these should be introduced in coordination with health care providers in the public and private sectors. Populations living in remote or hard-to-reach areas and with limited access to health facilities can only be supported through community-based approaches, often in partnership with NGO partners. Well-planned public health communication and behavioural change programmes are essential to educating affected communities about the benefits, and correct use of malaria prevention tools.

11. Advocacy, Coordination and Partnerships

11.1 Advocacy

Advocacy aims at developing enabling environment by engaging and informing the political leaders, planners, bureaucrats, organized sectors, professional bodies, media and multi-sectoral partners for building support, eliciting sustained commitment and motivating them to be advocates. Strong commitment and overall progressive enabling environment are currently extant for malaria elimination in India with the adoption of the goal of an Asia Pacific free from Malaria by 2030 by the leaders from 18 countries of the Asia Pacific, including Honorable Prime Minister of India during the East Asia Summit in November 2014 as well as with the launch of NFME by the Honorable Union Minister for Health & Family Welfare in February 2016. Sustained focus with robust financial investment, political will and innovation are imperative to realize the vision of elimination. Therefore, strategic advocacy should be priority towards adequate and sustainable resource allocation and garnering political support through appropriate channels.

As articulated in the GTS 2016-2030, involvement of the private sector, including industry/corporate, health facilities and other actors should be strengthened for service delivery/rational treatment/appropriate reporting of all malaria cases, treatment outcomes and deaths. In India, Corporate Social Responsibility (CSR) mandates that corporates should spend 2 per cent of their profit on CSR in bringing out much greater inclusiveness with special focus on health promotion, skill development, water, sanitation, etc. in their local area of operations under the new Companies Act, 2013.

11.1.1 National and State level

Under the NVBDCP, a host of advocacy events like observance of World Malaria Day, Anti Malaria Month, national symposium, conference, others, should be planned and incorporated in the annual planning. These events provide common platforms to showcase successes and unify diverse stakeholder initiatives for a common goal. Such events should have the participation of the Honorable Minister for Health and other Ministers, MLAs, MPs, prominent leaders. Other key participants should include planners and decision-makers, technical experts, non-health Ministry/Departments, donor and partner agencies, implementing entities and media (Ministry of Human Resource Development, Agriculture, Water Resource Development and Water Supply, Urban Development, Rural Development, Industry/ mining, Railways, Environment & Forest, Fisheries, Labour, Commerce, Women & Child Welfare, Defence, Home Affairs, External Affairs Transport, Information, Sports & Culture; Builders' Associations, Market Associations, private sector hospitals, Pharmacists' Association; Civil society organizations (NGOs, FBOs), Medical Colleges/University, IMA, IAP and API (Indian Medical Association, Indian Association of Pediatricians and Association of Physicians of India) and their State/District Chapters, Media).

A press meet/briefing should be held and press releases should cover the entire country. At this platform, the vision, mission of the NVBDCP and achievement of milestones and way forward in the pathway to elimination should be reinforced towards socio-economic advantages in terms of improvement in the quality of life of the people, especially the poor, marginalized groups and key populations (women, children, etc.), and sustaining resource allocation or additional resource mobilization. In addition, deliberations should be held on roles and responsibilities of multi-sectoral stakeholders with an Action Plan. The event may be supported by demonstration of mosquito larvae, larvivorous fish, LLIN use, insecticide treatment of bed nets, minor environmental modifications for breeding source reduction, etc. for enhancing awareness along with display of BCC materials (banner, poster, signage, etc.), distribution of BCC Kit (brochure, flip book, poster, leaflet, flyers, caps, T-shirts/bag, calendar, stickers on signs and symptoms, early diagnosis and complete treatment, use of larvivorous fish, house coverage under Indoor Residual Spraying, measures for source reduction, etc.).

A logo/branding enables the public to identify the programme and its efforts, provides a consistent visibility that string together various activities at all levels. Hence, NVBDCP logo should be further promoted towards assurance of service delivery together with NHM and partners, as appropriate.

Involvement of celebrities like players, movie/music stars should be considered for endorsement of the cause by them as “Ambassadors” or “Champions”. A cured malaria patient could be promoted for suchlike endorsements.

In addition to above-mentioned events, regular coordination and collaboration with other sectors should remain extremely important and further strengthened. The efforts would need to progress beyond advocacy (although would remains critical) to commencement of ‘dialogue’ by exchanging information, determining priorities to ‘collective planning and action’ to make the programme effective and sustainable.

A National Task Force under the chairmanship of Secretary for Health & Family Welfare or DGHS/DHS should be constituted as an apex body with representations from various Government Departments, and other stakeholders with clear Terms of Reference, which should meet periodically to identify specific areas of coordination, collaboration; to discuss concerns, best practices that could be replicated; to give directions for policy, planning, implementation and even to effective mobilization/pooling of resources. The list of members and Terms of Reference should be clearly articulated. Engagement of ministries of education, tribal affairs, environment, industry, transport and tourism, finance, and also external affairs and home affairs for interventions in border areas, is especially important, as is the active engagement with regulatory authorities.

An interface should be established to make information accessible, to exchange ideas, to plan and review actions in harmonized and synchronized manner, to organize and

unify resources, link partner/collaborator organizations' websites, etc. This would preclude fragmented/duplication of efforts, leverage expertise and strengths and facilitate mobilization/efficient use of resources. Joint review would be part of the ToR.

11.1.2 District level

Advocacy events, meetings should also be held at local levels – districts. The District VBDCP should be in the lead and under the overall guidance of the State VBDCP/NVBDCP. The Administrative Head of the District, Heads of other Departments, MLAs/MPs, prominent leaders in addition to health and non-health sector. The participants should include district level non-health Ministry/Departments, donor and partner agencies, implementing entities and media (Ministry of Human Resource Development, Agriculture, Water Resource Development and Water Supply, Urban Development, Rural Development, Industry/ mining, Railways, Environment & Forest, Fisheries, Labour, Commerce, Women & Child Welfare, Defence, Home Affairs, External Affairs Transport, Information, Sports & Culture; Builders' Associations, Market Associations, Hoteliers' Associations, private sector hospitals, Pharmacists' Association; Civil society organizations (NGOs, FBOs), Medical Colleges/University, IMA, IAP, Media).

In selected high endemic districts or in districts aiming at elimination, the Honourable Minister of Health may also be invited. The convener of the event would be the District Malaria Officer. The participants should include district officials from various Departments under the MoH, in addition to other Ministry, viz. Education, Agriculture and Fisheries, Water Resources, Women & Child Welfare, Home Affairs, Sports & Culture; as well as representatives from private sector hospitals, and Civil society organizations (NGOs, FBOs), and selected ASHA/CHV, Village Head from high endemic villages. In addition, selected Medical Officers of CHCs and Health Posts; as well as selected School principals/teachers, Private Practitioners, Laboratory Technicians, local media persons, prominent leaders.

An Action Plan with roles and responsibilities would be drawn. Display and distribution of BCC materials would be emphasized during these events. During this event, a CHC/PHC/Sub centre and even villages could be selected for recognition, and branded as "model". A broad based District Task Force under the chairmanship of District Administrator should be constituted with clear Terms of Reference.

11.1.3 Village (community) level

Advocacy meeting would be held at village level under the chairpersonship of the respective Chief. The participants would include members, community, religious leaders, schoolteachers, storekeepers, civil society organizations (FBOs, CBOs, Self Help Groups), and community health volunteers. It needs to be ensured that the meetings have sufficient women representation.

The agenda for the consultation meeting would be the same as mentioned above for the district level, although discussion on local solutions to issues in the form of action should be encouraged. Cleanliness campaign would also be part of the action plan. In addition, public announcements would be carried out and aided by display and distribution of BCC materials. On the day of the event, live demonstration of mosquito larvae, larvivorous fish, use of LLIN, insecticide impregnation of bed nets, source reduction through minor engineering methods as well as early detection and prompt treatment of fever cases would be emphasized. During this event, a community member preferably a cured patient could be selected for recognition, who would also be promoted as “change agent”.

11.2 Intersectoral Action

Developmental activities undertaken by different sectors have the potential to lead to proliferation of mosquito breeding sites and thereby result in increase in malaria incidence. Intersectoral action, both collaboration and coordination, has key role in malaria elimination. As example, coordination with various Ministry and Departments should be emphasized to accelerate the efforts to achieve universal sanitation coverage as envisaged under the Swachh Bharat Mission. The Mission coordinator is the Secretary, Ministry of Drinking Water and Sanitation with two sub-missions, the Swachh Bharat Mission (Gramin) and Swachh Bharat Mission (Urban).

The programme managers should collaborate with other relevant sectors which can contribute effectively to malaria elimination, and in particular mosquito control. The potential roles of various sectors and agencies in malaria control is indicated in table below.

Table 11.1 Potential roles of various sectors and agencies

S. No	Sector/Agency	Roles
1.	Agriculture	• Pesticide management and judicious use of pesticides • Farmer field schools to implement integrated pest and vector management • Popularizing the concept of dry-wet irrigation through extension education
2.	Water resource development	• Maintenance of canal system • Intermittent irrigation • Design modifications and improvement of lining of canals • De-weeding for proper flow • Creating small check-dams away from human settlements

S. No	Sector/Agency	Roles
3.	Water supply	• Swachh Bharat Mission • Repair of leakages to prevent pooling • Restoration of taps • Diversion of wastewater to ponds / pits • Staggering of water supply • Mosquito proofing of water harvesting devices • Repair of sluice valves • Improved designing to avoid undue water logging
4.	Urban development	• Swachh Bharat Mission • Issue of building use permission after clearance from health department • Safe rainwater harvesting • Mosquito proof design of dwellings
5.	Industry/ mining	• Improving drainage and sewerage systems • Safe disposal of used containers / solid wastes • Mosquito proofing of dwellings • Safe water storage and disposal • Use of ITNs/LLINs
6.	Railways	• Proper excavations • Maintenance of yards and dumps and antilarval activities in areas within their jurisdiction • Housing for health safeguards • Promotion of use of ITN/LLIN amongst the railway employees
7.	Environment/ forest	• Pesticide management policy • Environment management policy • Reclamation of swampy areas • Social forestry
8.	Fisheries	• Institutional help • Training in mass production of larvivorous fish • Promotion of composite fish farming schemes at community level
9.	Road and building sector	• Proper planning • Merging pits by breaking bunds • Excavations in line with natural slope / gradient • Making way for water to flow into natural depressions / pond / river • Follow up action after excavations
10.	Remote sensing	• Technical help and training in mapping environmental changes and malaria risk using GIS

S. No	Sector/Agency	Roles
11.	Education	• Vector control teaching in educational curriculum • Issuing directions for monthly drive on cleaning of school premises, • Cleanliness of surroundings and checking water containers for mosquito breeding • Incorporation of vector control activities in the training curriculum of ICDS functionaries under the department of women & child development as well as their involvement in vector control activities
12.	Mass media	• IEC activities • Advocacy
13.	Local self-government/ Panchayati Raj Institutions/ village councils	• Overall cooperation in the ongoing malaria programme like IRS, ITN • Ensuring public participation as and when needed
14.	Corporations/ Municipality	• Coordinated action for vector control in urban areas
15.	NGOs /FBOs / CBOs	• Community mobilization • Promotion of programme activities • Village level training • Distribution of IEC material • Monitoring and evaluation • Feedback on achievements

11.3 Public Private Partnership

The NVBDCP envisages a greater role for public private partnership (PPP) towards its aim of enhancing malaria control and ultimately achieving malaria elimination. PPP is sought with an increasing number of non-governmental organizations (NGOs), faith based organizations (FBOs), community based organizations (CBOs), industries/PSUs/Corporate, and local self-government (e.g. Panchayati Raj Institutions). The states [category 3 and 2 states (and such pockets in category 1 states)] should continue their efforts for establishing partnerships with reliable organizations to start/strengthen PPP by adoption of one or more schemes per the NVBDCP guidelines. The objective is to provide uniformity in diagnosis, treatment and monitoring through a wider programme base towards maximizing access to EDCT, appropriate vector management.

The PPP schemes are of two categories based on their size and extent. Category 1 schemes involve partnerships with local self-government (panchayat) or panchayat level NGO/FBO/CBO with a population coverage of minimum 5,000. Category 2 schemes

involve partnerships with NGOs/FBOs (and industries/PSUs/Corporate) who can provide service delivery at the block level to cover a population of at least 100,000.

Non-Governmental Organization (NGO), Faith Based Organization (FBO)

The NGO/FBO[11] could be an organization, charitable company, public trust, cooperative or professional body having legal status by registration under the appropriate Act. It should have an established base at Block level and a minimum of three-year experience in the development sector particularly in health or related field in the area of operation. The NGO/FBO should submit the details of geographical coverage and network organizations at the time of signing of the MoU. The NGO/FBO should also provide details of projects undertaken during the last three years. The NGO/FBO must have strong credible links with the community and may effectively integrate malaria control activities with its ongoing programmes. The NGO/FBO should have clean audit reports relating to the past activities of the organization. It should not have been blacklisted by any government agency. The organization must not be involved in litigation on any socially sensitive, religious, financial or any other issue.

Industries/PSUs/Corporate

Large scale industrial establishments, PSUs like TISCO, SAIL, Coal India Ltd., NTPC, Indian Oil Tea estates, etc. in addition to large scale building and other construction projects, are responsible for the health and well being of their employees. They are expected to play useful role in the malaria elimination in concerned areas. The NVBDCP should also foster partnerships with industries/PSUs/Corporate, who can play a major role in prevention, EDCT amongst their employees and also the local population residing around their premises. Industries which have a good track record of being involved in local health projects should be involved for PPP schemes.

Local self-government (Panchayat) / Panchayat level CBO

The panchayat selected should be a duly elected local self - government with a sarpanch and 5 members covering a minimum of 5,000 population. Panchayat level CBOs for PPP schemes should have a duly elected body and an established base at village level for at least 1 year and should be able to implement the project in an area with a population base of at least 5,000. The organization must be involved in development activities.

PPP schemes

There are six PPP schemes under the malaria programme (three schemes on early diagnosis and complete treatment; and three on IVM) as mentioned below.

Early diagnosis and prompt treatment

Scheme 1: Provision of outreach services for early diagnosis and complete treatment

[11] Faith Based Organizations (FBOs) are CSOs such as, Sri Ramakrishna Mission, Bharat Sevashram Sangh, Church Associations/Organizations, etc.

Scheme 2: Provision of microscopy and treatment services
Scheme 3: Hospital-based treatment and care of severe malaria cases

IVM

Scheme 4: Promotion of ITNs & LLINs, insecticide treatment of community-owned bed nets and LLIN distribution
Scheme 5: Promotion of use of larvivorous fish
Scheme 6: IRS

The NVBDCP provides grant-in-aid, health products (LLINs, diagnostics), antimalarials, other commodities and technical support for the PPP schemes as applicable to each scheme. BCC is an integral part of all the schemes.

Scheme 1. Provision of outreach services for diagnosis and treatment

Provision of outreach services for early diagnosis and complete treatment of malaria is planned through this scheme with particular preference given to areas with MPW (M) shortage, areas far-off (> 5 km) from PHC/any government health facility and areas from where deaths due to malaria have been reported. The population to be covered is minimum 5,000 and the organization should arrange for trained staff/volunteers @ 1 per 1,000 population. The first activity is a household survey for enumeration and KAP assessment on early diagnosis and complete treatment. Arrangements should be made by the partner organization for performing RDT, making blood smears by staff/volunteers who should be trained; and transportation of slides to the laboratory, collection of reports and administration of complete treatment. The records of diagnosis, treatment and logistics should be maintained as per NVBDCP formats and reports should be submitted to the designated reporting authority (Sub centre) on fortnightly basis. No charges should be levied on patients for any service rendered. The trained staff/volunteers should also be involved in referral of patients with signs and symptoms of severe malaria, pregnant women and children under 6 months with fever, to appropriate health facilities.

Scheme 2. Malaria microscopy and treatment services

Augmentation of correct diagnosis by microscopy and malarial treatment should be promoted through health facilities/mobile clinics under this scheme with particular preference given to areas far off (> 5 km) from PHC/any government health facility with microscopy services. The population to be covered under the scheme is minimum 25,000. Each facility/clinic should be capable of providing quality assured malaria microscopy staffed by at least one trained LT and a qualified allopathic medical practitioner, trained under NVBDCP. Each LT should be able to examine 50 blood slides per day and communicate the results within 24 hours of receiving the slides. Arrangements should also be established for timely referral of severe malaria cases. No charges will be levied on patients for any service rendered. The records of diagnosis,

treatment and logistics should be maintained as per NVBDCP formats and reports should be submitted to the DMO/PHC/CHC on fortnightly basis.

Scheme 3. Hospital-based treatment and care of severe malaria cases

The partner organization under this scheme should be running hospitals capable of providing treatment to malaria cases, and in particular inpatient treatment to severe malaria cases as per NVBDCP guidelines and also provide follow-up treatment for these patients. The population to be covered under the project will be at least 100,000. For outdoor treatment, blood smears will be made for all suspected malaria cases and results provided on the same day followed up with complete treatment. No charges should be levied on patients for any service rendered. Transportation costs for malaria cases may also be included in the budget if the hospitals can provide ambulances for transportation of the severe malaria cases. Apart from the reports on diagnosis and treatment of malaria cases as per NVBDCP formats, the hospitals are required to submit detailed reports of malaria deaths on a fortnightly basis to designated DMO/PHC/CHC.

In addition to the above activities specific to schemes 1 to 3, following are additional activities common for these schemes.

- Training of staff and volunteers
- To inform PHC/DMO if there is an unusual increase in fever cases suspected to be due to malaria or a death occurs due to malaria or suspected malaria.
- To conduct BCC activities, especially IPC, for making patients and their families aware about early diagnosis and treatment of malaria as well as the preventive measures. Support should be provided through BCC activities (community meetings, public announcements, etc.) targeted for the community at large, local opinion leaders, teachers, private health service providers, religious leaders, and traditional birth attendants. Involvement of SHGs in BCC activities relevant to the scheme should be emphasized.
- Maintenance of records and reporting to designated Sub centre/PHC/DMO per set timelines.

Scheme 4. Promotion of ITNs and LLINs, insecticide treatment of community-owned bed nets and LLIN distribution

The partner organization will conduct household survey on bed net use and KAP to prepare the action plan in consultation and/or coordination with concerned State/District VBDCP. In areas not supplied with LLINs, it will motivate the community for periodic treatment of bed nets in use with insecticide and collaborate with the district health authorities to organize camps for bed net treatment before the beginning of the transmission season. It will also undertake LLIN distribution in areas selected by the NVBDCP per guidelines and conduct listing of households for working out requirements for targeted beneficiaries. Post-distribution, the organization will undertake monthly visits to verify bed net use in 5% of randomly selected households. The population

covered by the project will be minimum 5,000. The records of LLIN distribution, treatment of bed nets and logistics should be maintained as per NVBDCP formats and reports should be submitted to the DMO/PHC/CHC.

Scheme 5. Promotion of use of larvivorous fish

The partner organization will promote and supervise the use of larvivorous fish for mosquito larval control. Survey should be conducted to enlist perennial/seasonal water bodies that are potential mosquito breeding grounds and prepare an action plan. It will obtain larvivorous fish from the mother hatchery at PHC/district level and release them in the identified water bodies. It will also construct hatcheries according to the need and in consultation with the concerned PHC/CHC/District VBDCP and maintain the hatcheries, especially in areas without district/block/PHC level hatcheries. The project will cover a minimum of 5,000 population. The records of relating to this activity (list of water bodies, hatcheries) and logistics should be maintained as per NVBDCP formats and reports should be submitted to the DMO/PHC/CHC.

Scheme 6. IRS

The organization will undertake IRS in coordination with District VBDCP to cover a minimum 5,000 population. It will make a micro-plan for spray in coordination with the DMO including the requirements of manpower, insecticides and equipment and the spray programme.The selection of villages for IRS will be done by the DMO as per the NVBDCP guidelines. The organization will recruit spray squads, arrange for transportation and storage of insecticides, equipment maintenance and proper disposal of insecticide remnants after the spray. The daily summary of spray operations will be maintained including the number of households covered and rooms covered. The records of relating to this activity and logistics should be maintained as per NVBDCP formats and reports should be submitted to the DMO/PHC/CHC.

In addition to the above activities specific to schemes 4 to 6, the following are additional activities common for these schemes.

- Training of staff and volunteers
- To conduct BCC activities, for making community aware about preventive measures. Support should be provided through BCC activities (community meetings, public announcements, info- or edu-tainment, etc.) targeted for the community at large. Involvement of SHGs in BCC activities relevant to the scheme should be emphasized.
- Maintenance of records and reporting to MO-PHC/DMO

Under State Health Societies/NHM, PPP guidelines framed for various programmes may also be followed.

Project proposal

The organization must mention its name and full address as well as the names, addresses, qualifications and experience of its head and other personnel who would participate in the project in its proposal. It will also provide details of projects undertaken during the previous three years. The project proposal should be accompanied by the following documents:

- Copy of the registration certificate
- Bye laws and Memorandum of Association
- Annual report of previous three years
- Self-assessment report
- Audited statement of accounts of previous three years
- Organogram of the NGO with details of executive members
- Details of medical and non-medical personnel available
- Certificate stating that it is not receiving funds for the proposed activity from any other national/international agencies or State government.
- Copy of an affidavit mentioning that the organization has/is not involved in litigation on any socially sensitive, religious, financial or any other issue.

The organization should briefly comment on its infrastructure, personnel and financial capabilities and enclose the requisite supporting documents. The proposal must specify clearly its objectives and the output indicators, consistent with the objectives. These should be appropriate to the scale and nature of the problem it seeks to address. The activities should be consistent with the NVBDCP priorities and strategies. The project may integrate the malaria project implementation with its ongoing activities.

The organization should have the minimum number of staff for the project implementation and if any additional personnel are required, the same should be listed in the proposal. However, the sanction for appointment of additional staff will be at the sole discretion of the PPP Technical Advisory Committee (TAC).

The work-plan should give a detailed description of the services that will be provided, and place of performance and completion dates for each task. The project duration will be for a minimum of one year and maximum three years. The proposal should have a calendar of activities for each month.

The budget lines should be clearly laid out with the proposed expenditure in accordance with NVBDCP guidelines, flexible by 10%. The role of each staff and their salary projected in the budget should be justified and reimbursable expenses explained for each activity.

The proposal will be submitted to the appropriate level – NVBDCP, State/District VBDCP.

Scrutiny of proposals

The PPP proposals received will be placed before the TAC.

At the district level, TAC should comprise the following:

- Chief District Medical Officer (CDMO) or District Medical & Health Officer (DMHO) as Chairperson
- DVBDCO as member secretary
- Block Development Officer (BDO)
- One member from the State Vector Borne Diseases Control Society
- One NGO member from the District Vector Borne Diseases Control Society (DVBDCS)
- One government department member from DVBDCS
- Two members, one each from the District Rural Development Department and District Fisheries Department
- One member from a registered NGO/FBO involved in social development activities, and not participating in the project and not part of DVBDCS.

At State and NVBDCP levels too, appropriate composition of TAC should be established or existing TAC (or a sub group pproved by such TAC) should scrutinize the proposals.

The TAC will scrutinize the proposals with reference to the activities specified in the State PIP/action plan and make one of the following recommendations:

- Approve the proposal in toto and recommend it;
- Recommend modifications in the proposal in terms of strategies and methodologies; and
- Reject the proposal after recording the specific reasons

The TAC will also review the progress of the ongoing projects at set intervals and recommend continuation.

The organizations whose proposals are recommended by the TAC for modification will be informed of the decision and invited to participate in a one-day orientation programme conducted at the respective level, who will orient the organization on proposal development and all aspects of project implementation. Thereafter, the organization will modify the proposal and submit the revised proposal for the TAC's consideration.

Proposals approved by the TAC will be taken up for field inspection by a Joint Appraisal Team (JAT) consisting of one member of SVBDCP, who will be designated as zonal officer for specific districts, one TAC member and the respective MO-CHC/PHC. The JAT will also assess the credibility of the organization in the local community and place the field inspection report, along with the TAC's recommendation before the

scheduled meeting of the Executive Council (EC) of SVBDCP, chaired by the State Health Secretary for consideration and decision.

The organizations whose proposals are rejected by the TAC, JAT or EC will be informed about the decision in writing, stating briefly the reasons for rejection.

Release of funds

The DVBDCP shall work out the requirement for funds for PPP for malaria control (NGO services) and send to SVBDCP along with the district action plan/PIP. The concerned SVBDCP shall examine the requirements on the basis of (a) annual action plan of the DVBDCP; (b) actual expenditure in the previous quarter of DVBDCP; (c) future action to be taken by DVBDCP in the next quarter; and (d) receipt of quarterly statement of expenditure of DVBDCP duly approved and signed by its member secretary and chairperson.

The Directorate of NVBDCP will release funds to SVBDCP for PPP (NGO services) subsequent to review of budget estimate submitted by the state and administrative approval and expenditure sanction by MOH&FW. The SVBDCP will release 100% of the sanctioned budget for PPP (NGO services) to DVBDCP for one year as per NVBDCP Guidelines.

The DVBDCP will keep the funds in a separate bank account for withdrawal and release to the partner organization in two 6-monthly instalments by cheques in the first year under intimation and approval of SVBDCP. The first instalment would comprise the entire non-recurring expenditure of the project plus 50% recurring expenditure earmarked for the first six months. The second instalment will be released after (a) receipt of the SOE and UC from the organization by DVBDCP and (b) approval of inception/progress report by the TAC. Any unspent balance is to be carried forward to year-2, provided continuation of the project has been approved by the TAC. There will be a flexibility of up to 10% reallocation of funds among budget heads.

The block level organization will have at least Rs. 100,000/- balance in bank account and submit a bank guarantee of 10% of the MoU amount within one month of signing of MoU. It will also agree to invest 10% of the MoU amount in kind in the form of infrastructure, staff etc. to implement the proposed scheme.

Performance appraisal

Retention of grant and release of funds will be based on performance of the organization. The performance appraisal will be on the organization performing the following:

- Meeting the identified terms of reference, tasks to be carried out, reporting requirements and review processes and output indicators

- Evaluation of progress of project as per schedule
- Demonstrate qualitative and quantitative improvement in meeting the needs of the community at the end of each year.

Reporting requirements

The organization will submit reports (including financial report and performance details) to the designated reporting authority at state/district levels as per following reporting requirements along with duly certified SOE and UC, who will in turn place it before the TAC:

- Inception report in the 7th month of the commencement of the project
- Progress report at the end of year-1
- Progress report at the end of year-2
- Full and final project report at the end of year-3

The TAC will forward above mentioned reports to SVBDCS for information, which in turn, will forward copies to the Directorate of NVBDCP.

The records of relating to any activity and logistics should be maintained as per NVBDCP formats and reports should be submitted to the concerned State VBDCP/DMO/PHC/CHC.

Termination of project

If the achievements of the project are below 50% at the end of year-1, the TAC would reconsider the project for continuation. In case the achievements are below 75% at the end of year-2, the TAC may recommend termination of the project.

The project may be terminated by giving a written termination notice of not less than thirty days, if any of the events specified below take place.

- If the organization does not remedy a failure in the performance of their obligations under the MoU, within thirty days of receipt after being notified or within such further period as the TAC may have subsequently recommended termination in writing.
- If the organization, in the judgment of the MO-PHC/DVBDCO/DVBDCS/TAC has engaged in corrupt or fraudulent practices while submitting the project proposal or in executing the MoU.
- If the DVBDCS/TAC/SVBDCS, at its sole discretion and for any reason whatsoever, decides to terminate the contract.

Either party shall have the right to terminate the MoU at any time, giving notice of thirty days in writing indicating reasons for the same to the other party. If the other party wishes to continue the contract, it must respond in writing within thirty days of receipt of termination notice. If a resolution between the two parties is not possible at the level of TAC, then DVBDCS and SVBDCS (in that order) shall attempt to

resolve the dispute. A final decision on this matter will be made, if necessary, by the DHS/State Health Secretary or his/her designee.

Monitoring and evaluation

Monitoring and evaluation of the activities of panchayat/panchayat level (covering at least 5,000 population) on a monthly basis will be the responsibility of respective reporting authorities. Based on the performance and fulfilment of reporting requirements, the MO-PHC will recommend sanction for further support/assistance to DVBDCP, who in turn, will recommend to the SVBDCP.

In case of block level NGOs/FBOs (covering at least 100,000 population), bi-monthly monitoring will be done by the DVBDCP, as per the laid down benchmarks, output indicators and reporting requirements in the MoU. The DVBDCP will take the decision after undertaking random visits to assess the activities of the organization in at least 10% of the coverage area, apart from quarterly visits to the villages.

12. Behaviour Change Communication and Community Participation

12.1 Behaviour change communication (BCC)

BCC is an integral part of the malaria elimination. Whilst the overall goal and specific objectives of the BCC are same as in the NFME 2016-2030; specifically BCC would support the attainment of desired behaviour outcomes relating to case management and prevention as well as support advocacy and partnership building initiatives within an enabling environment. The desired behavioural change is targeted for appropriate uptake and quality delivery of services. Through information and also empowerment to influence action would be key elements of BCC.

The specific objectives of BCC are to:

- Enhance awareness regarding reduction of transmission risk and availability of services for diagnosis and treatment at different levels;
- Promote attitudinal changes among target audiences leading to informed decisions, modified behaviour and desirable practices at individual and societal level;
- Stimulate increased and sustained demand for quality prevention and care services and optimal utilization of available health care services; and
- Build support for the malaria programme from partner organizations, influential sectors (corporate houses, political representatives, social activists, media, civil society organizations, etc.) and health care providers and elicit commitment for action;

Guiding Principles

- Evidence-based planning and implementation by understanding situation, barriers and influences, responding to concerns, emphasizing benefits of the desired behaviour; the needs of individuals, families, communities, care providers;
- defining objectives to achieve through BCC that are aligned with program objectives;
- synergizing advocacy, social mobilization, BCC for enhancing knowledge and awareness, responsive behaviour, and creating/strengthening an enabling environment through strategic work plan; establishing advocates/change agents/branding;
- massive, repetitive, intense and persistent interventions using locale- and context-specific channel-mix;
- coverage and target audience segmentation based on epidemiological, demographic as well as scio-economic, behavioural information and analysis of needs and barriers;
- clear and consistent messages that are socio-culturally appropriate targeting specified behavioral outcomes [with special emphasis on dynamics of communities, key populations (“high-risk” population sub-sets) - pregnant women, children under 5, school going children, jhum cultivators/those staying in the field, persons moving within and outside country that are often most at risk; and care givers];

- developing and strengthening capacities on “what is BCC" and concept of behavioural analysis, how to channel such evidence into planning/implementation/M&E, and linking responsive behaviour with outcome of BCC efforts, etc. (well-trained BCC leadership and staff within the VBDCP);
- inculcating participatory approaches to foster ownership, self-monitoring and ensure sustainable end results;
- coordination and harmonization of efforts by stakeholders; removing duplication;
- strengthened M&E, and use of specific indicators relating particularly behaviour outcomes/impacts relative to baselines to re-align strategy and implementation framework, if necessary; and to inform planners, decision-makers; documentation of lessons learned, best practices i.e. what worked and what did not;
- designing and dissemination of a comprehensive package with consistency and quality control as essential elements instead of multiple messages, guidelines, implementation plan, data collection tools and reporting formats;
- availability of and accessibility to quality assured products/medicines and service delivery as pre-requisites; and
- consolidation of commitments by adequate and timely resource mobilization, allocation.

A comprehensive BCC strategy should be a key step followed by planning. Evidence collation and analysis relating to health related behaviours are key elements for formulating strategy and messages and materials, channels. NVBDCP, experts as well as key stakeholders should be involved in review the evidence as well as the need for appropriate regarding messages and materials. As various types of channels to convey a message are selected; the reach, frequency, time, costs, the impact would be carried out. The advantages and disadvantages of selecting and using a channel; or use of mixed channels to maximize cost efficiency and impact would be considered.

BCC should be carried out through umbrella campaign; focused localized campaign, and routine activities on ground. A major focus would be on: providing a steady flow of information on priority behaviour through locale- and context-specific channel-mix targeted to the right audiences and using the right tools and channels at right times; ensuring continuity, which is critical for recall; sustaining a positive message in front of key audiences and countering negative messages/stories; publicizing achievements and success stories; and targeting key population viz. women and children, as critical audience. There should be clarity regarding: five Ws: 1) What: the specific behaviour/action aimed at; 2) Who: the target - care taker/care provider/policy maker; 3) When: the time frame; 4) Where: the site; and 5) Why: the overall purpose. In addition, “how” or the approach/mode would also be an inherent component.

BCC would focus on mix of community outreach programmes (community consultation or meetings/info- or edu-tainment/public announcements/school programmes). The activities should be led by the community towards community ownership, support, and engagement.

Information through entertainment or education through entertainment is powerful medium. The music/dance performances (often using the traditional/folk media) with information dissemination/education of the key players as well as the community at large should be a key channel. This channel is important on account of reach, credibility, and ability to adapt performances to the standardized messages as well as costs. The focus and venue of the show are to be selected with care, keeping in mind the socio-cultural environment of the area and target audience.

Participatory **Community consultations/meetings** should be promoted at village level and focus on orientation/sensitization regarding EDCT, personal protection, environmental management. Script or slides and/or AV capsules may be used in addition to flipbooks, flash cards, etc. to assist coordinators and trigger discussions.

Interpersonal communication (IPC) is considered as the preferred primary approach. IPC in and outside the health facilities/house, is effective and works best when there is one-on-one contact between the volunteers/health workers and the person whose behaviour is to be changed to adopt new knowledge and practices. IPC would require training and other aids to implement and scale up. IPC from peer to peer and/or family member to patient/family member and/or support groups and individual/family should also be encouraged subsequent to relevant orientation. IPC materials should include: Flip book/Fact sheets with a list of frequently asked questions and answers; how-to booklets and talking points for discussions with patient/family at facilities or homes or within the community.

Point of service promotion

- Identification signboards and badges, with their names should be promoted.
- Ensure Village Head, Religious and other leaders, etc. are promoting anti malaria logo/symbol, display of signage, message delivery.
- Use of specific logo/symbol, theme may be used on official stationery, letterheads, buildings, etc.

Mass media and mega events

Appropriate mass media/mega events should be tapped for dissemination of messages through umbrella campaigns and/or local campaigns and routine programmes. Sponsorship/co-endorsements for above-mentioned activities should be explored. Incentives/prizes in terms of vouchers, samples, etc. may be sponsored through contests to encourage the audience to adopt a desired behaviour. These would include:

- Broadcast/telecast: TV, radio – skits/spots/soap operas, jingles, music and dance programmes, interactive programmes (phone-in programmes/talk shows/capsules within reality shows/quiz programmes);
- Multi-media: Documentaries, music videos, film, etc.;
- Mobile technology/telephone: mass messaging (sms)/calls.

- Print: Newspapers, magazines; booklets, brochures, gate folders, mailers and posters, pamphlets, leaflets, stickers, bus tickets, OPD registration forms, calendars, and wall charts/information scroll, comic strips/books, games;
- Outdoor publicity: Hoardings/billboard, Glow Signs, branding on wheels (bus, taxi, private car) - panel, blimps;
- Mega event [Sports events, Celebrity (Music/movie/dance) show].

In order to aid communication activities, BCC materials (mostly pictorial) should be designed, printed and disseminated (following pre-test) in coordination with the relevant Departments. The materials would stimulate discussions between providers and target audiences. Pre-test (and also post-test after application at community/family/individual level) is vital to get response from sample target audiences (through FGDs, in-depth interviews, etc.) on comprehension, appeal, relevance, credibility, motivation to act. Responses should also be sought regarding ease of use, material life/storage, etc.

The BCC materials could include, but not limited to,

- Flip Books, Flash cards, Story Cards, Comic Books: To be used by health workers, volunteers, to counsel target audiences during facility/home visits. Illustrated booklets (predominantly visual) with stories may be designed targeting especially children.
- Interactive games and puzzles that familiarize users with the desired practices.
- Stickers: For distribution among vulnerable groups, school children, shops, and other places to remind people about the core themes on prevention and control of malaria.
- Badge, signboards with logo: For identification of those associated with the campaign, such as volunteers and other health workers; Bag with logo: For volunteers/health workers to carry BCC aids during home visits.
- Calendars: To promote the messages among influencers, VHSNC/PRI members, Village Head, etc.
- Mailers, gate folders and wall charts: For civil society/other sectors, doctors, pharmacists, health workers.

Target audience segmentation (primary, secondary, tertiary) corresponding to those to whom the messages would be targeted disaggregated by demographic/political/socio-cultural/economic profile, should be a critical element of BCC strategy.

Messages should focus on motivating behaviour change amongst the target audience, instead of giving information only. As feasible, a creative team (i.e., an agency) may be commissioned to produce messages and materials.

- Messages should draw from knowledge about target audiences and capture the attention (evidence-based) and focus on achieving the BCC objectives.
- Messages should be tailored to the context - socio-cultural, geographic, gender, etc.
- Messages should be relevant and relate to real life situation.

- Messages should focus on benefits and remove barriers (including myths and misconceptions).

A practical approach is to translate the central message prototypes into different local languages. The messages suggested for use by providers at different levels are given in table below. The practical approach in BCC is to translate the central message prototypes into different local languages and use them to achieve the BCC goal. The messages suggested for use by providers at different levels of the malaria program are given in table below.

Table 12.1 Messages suggested for use by providers at different levels of the malaria program

Provider	Messages
ASHA/CHV	**To community at large** • Any fever could possibly be malaria • Malaria can be dangerous, and therefore should be treated in time • When you/your family members have fever, come to me immediately • I can test and tell you immediately if you have dangerous malaria or not • I have medicines which are free and also very effective against malaria • Sleep under a bed net treated with insecticide or LLIN as it prevents malaria-causing mosquitoes biting you. It is even more important for pregnant women and children to sleep under the treated bed net/LLIN. **To patients with a positive result for *P. falciparum* with RDT/microscopy** • You have a dangerous type of malaria • Take the full course of medicines (ACT) for complete cure • Let me know if you have fever even after completing the treatment • If you develop drowsiness, severe vomiting, or convulsions, you need to rush to (specify) the hospital. You will get free admission and treatment there. **To patients with a positive result for *P. vivax* with RDT/microscopy** • You have malaria but this type of malaria is usually not very dangerous but sometimes may become dangerous • You need to take chloroquine tablets for three days and primaquine for 14 days and if you do not complete the treatment, malaria could come back again

Provider	Messages
	• If you feel that your condition is getting worse, you should come back to me or consult the doctor **While distributing LLINs** • This is an expensive bed net. Wash it only a few times, i.e. only once in a few months, so that its effect can be extended for more than three years. If you are found selling this net, you can be punished. Demonstrate how to hang the bed net indoors as well as outdoors **Before and during the IRS** • Make sure that you are present in the house when the spray team comes on (give the date of spray) • The actual spray will take only a few minutes • The insecticide in the spray should not harm you, but keep the cooking utensils and food covered during the spray and wash them after the spray, before cooking or eating • Make sure that rooms in the house are sprayed • Do not wipe off the insecticide from the walls • Do not apply mud plaster or paint on the sprayed wall
MPHW (Male/ female)	**As above, plus** • Whenever you have fever, go to the volunteer (Name _____) in your village who has been trained to do blood tests and treat malaria. She will do a quick test and give the most effective medicine if you have malaria. The test and drugs are the best available anywhere and will be provided to you free of cost. • Let me or the PHC know immediately, if more people get fever within a few days, as this could spread quickly to affect many more people The contact phone number is _____
MO-PHC	**To the patient/family member of patient with a positive RDT/microscopy** • You have malaria (if *Pf*, tell that it is the dangerous type of malaria; and if *Pv*, tell that even though this type of malaria is usually not dangerous, but sometimes it can become dangerous) • Taking the full course of tablets (ACT/CQ with primaquine) will completely cure you • Let me know if you continue to have fever after you complete the treatment • If you develop drowsiness, severe vomiting, or convulsions, you need to rush to (specified) hospital. You will get free admission and treatment there.

BCC activities which are conducted throughout the year are enhanced during the observation of the antimalaria month (AMM). *The details on organization and activities of AMM are given in annex 14.*

Implementation framework

An implementation framework should be developed for the period turning strategies into an actionable mode across set timelines. The framework should be a budgeting, a management and a monitoring instrument too. The annual PIP should include an implementation framework: objectives, strategic approach, detailed activities, target audience and areas of coverage, implementation entity and timelines. The implementation framework should emphasize on: what (activity); and who (implementing entity), when (date/time), where (place), why (need/gap/challenge/cost-benefit) and how the activity should be carried out (process per plan). Implementation should be led by the NVBDCP in close coordination with all relevant Departments. Stakeholder coordination and collaboration should be a key element. Efforts should be made to ensure activities at each level are not duplicated, having appropriate spacing and applying the relevant approaches. Umbrella campaign related activities like, development of BCC materials, mass media programmes, symposia/panel discussions/workshops, observance of major events like World Malaria Day/Anti Malaria Month should be directly designed, disseminated and managed by the NVBDCP and others. Designing, replication of BCC materials, etc. should be done at national/state level. Structures (manpower) and trainings for different implementation levels are outlined in the chapter on human resource and capacity building.

M&E of BCC would be an integral component of BCC strategy and overall PIP. Specific indicators should be devised as standardized measures of performance and results. These are expected to verify whether activities are being/ have been implemented as planned within specific timelines; ensure transparency and accountability; detect any shortfall and/ or constraint; provide valid and timely feedback to the decision maker(s), key stakeholders for informed planning and strategizing; as well as document and disseminate empirical evidence on ‘lessons learned’, thereby improving effectiveness of programme. For each indicator, definition, rationale, data source, frequency of data collection and reporting, level of use, means of verification, programme implication would be part of the national M&E Plan. Regular supervision and monitoring under NVBDCP should cover all aspects of advocacy, BCC, and community mobilization. Likewise, activities, BCC materials and messages should be periodically evaluated for its effect and for reasons for its success or failure. This should lead to revisions including revisions in strategy and plan.

BCC research per priorities should be regularly incorporated in the overall NVBDCP research agenda to provide evidence for changes in strategy, plan, necessary improvements in implementation framework, etc. Both quantitative and qualitative research may be performed to obtain insight into how to make programs and materials,

messages more relevant and influential to the target audience and suitability of a channel. Further KABP and barrier analysis, emotion/logic based motivation and driver analysis (target audience research going beyond demographics especially in terms of segmentation. The efforts may be coordinated with technical partners like the WHO, others.

12.2 Community Participation

Community participation has a crucial all-encompassing role in prevention and control of malaria and in diagnosis, treatment and referral of malaria cases. The various activities which can be supported and/or monitored by the community are given in table below.

Table 12.2 Scope for community participation in malaria control program

Programme component	Scope for community support	Scope for community monitoring
Screening, early diagnosis, radical treatment and cure	• Determining the person to play the role of the local volunteer • Spreading the message about the availability of RDT and ACT with the ASHA or other local person / volunteer, and about back-up facility when this provider is absent • Spreading message about the need to get tested for malaria early in the course of febrile illness • Spreading the message about reliability of RDT and ACT • Spreading the word about the advisability to save on costs by first reporting to the local malaria care provider • Supporting the provider in record keeping, as needed • Facilitating quick transportation of slides to the laboratory	• Demanding and ensuring one or more trained providers is available within realistic access of every habitation • Alerting authorities about non-availability or non-functioning of provider • Alerting authorities about stock-outs of RDKs or antimalarials • Alerting local providers and higher authorities about outbreaks

Programme component	Scope for community support	Scope for community monitoring
Referral care	• Ensuring early transportation of severe malaria cases to the referral centre • Helping the family avail government schemes supporting the costs of transportation and treatment*	• Demanding and ensuring immediate care for severe malaria cases at referral care centres • Ensuring that untied funds under NHM at village and subcentre levels are made available in a timely manner for poor families needing referral
IRS	• Determining dates of spray in partnership with district/PHC • Spreading the word about dates of spray • Informing communities about necessity of IRS • Accompanying spray teams to houses on day of spraying and convincing people to get complete spray done in their houses	• Monitoring whether spray operations are actually carried out as per norms and plan • Providing feedback about perceived effectiveness of insecticide spray
LLINs	• Determining the mode of distribution in partnership with district / PHC malaria authorities • Supporting educational efforts related to consistent and correct use of bed nets, particularly among small communities not frequented by health workers	• Ensuring equitable bed net distribution, as per norms • Preventing sale of bed nets by recipients for ensuring their use • Alerting appropriate authorities regarding any malpractices
Larval control	• Supporting source reduction efforts, using local labor and funds* as feasible • Spreading word about steps that households can take to eliminate breeding places	• Monitoring whether actual field work for source reduction has been undertaken as per norms and plan

*: Untied funds under NHM are available for this purpose with the blocks, PHCs, subcentres and village health sanitation and nutrition committees

13. Research

Complementing the current research agenda primarily directed at malaria control with research to develop tools, interventions, and strategies aimed at malaria elimination constitutes a paradigm shift.

Three categories of research are needed for effective malaria elimination:

1. Research and development for new anti-malaria interventions including drugs, diagnostics, vaccines and vector control tools which facilitate sustained interruption of transmission and those which address asymptomatic infections.
2. Research to help make policy decisions on interventions best suited for malaria elimination.
3. Operational and implementation research to understand use and effectiveness of interventions in the field and improve the delivery, quality, equity and effectiveness for malaria prevention and treatment.

Certain key examples of critical research needed to support malaria elimination identified by the Malaria Eradication Research Agenda (malERA) are as follows:

- In vitro culture and study of hypnozoites (persistent liver stages) of P. vivax
- Drugs to be used for mass drug administration to clear infections and provide prophylaxis to prevent new infections
- Vaccines that target different stages of the parasite life cycle, or the mosquito, with the key goal of interrupting transmission
- New vector control approaches for (i) outdoor biting/resting mosquitoes and (ii) achieving permanent reductions of vectorial capacity in areas where transmission is predominantly due to the highly efficient vectors
- New approaches for fast and accurate assessment of transmission at community level
- Tool kits to scientifically determine ‘‘health system readiness’’ for a switch to elimination efforts
- Strengthened monitoring and evaluation tools and strategies for interrupting transmission that are linked and embedded in the health and social systems

Drugs

There is a need for achieving high coverage of hard-to-reach populations by a single drug with a target product profile (TPP) that includes radical cure (eliminating all parasites including the liver hypnozoites of *P. vivax* or *P. ovale*), suitability for mass administration including for healthy subjects, and prophylaxis for at least 1 month after treatment, to outlast the typical development period of malaria parasites in vector mosquitoes.

There is also the need for development of new safe and effective drugs which are both gametocytocidal as well as acting against P. vivax hypnozoites as alternatives to primaquine which has significant side-effects, particularly hemolysis in those with G6PDdeficiency, compromising its widespread use in mass administration for elimination.

Vaccines

Currently there is a broader concept to develop ‘‘vaccines that interrupt malaria transmission (VIMT)’’ including anti-vector vaccines that target mosquito molecules essential for parasite development, highly effective pre-erythrocytic or erythrocytic stage vaccines, and vaccines targeting parasite antigens of sexual and mosquito stages of the infection.

Insecticides

Discovering and developing a broader range of insecticides, with novel modes of action that circumvents resistance to existing insecticides is a major challenge. The second challenge is the development of interventions that affect vectors that do not rest or feed indoors and are therefore not susceptible to current tools.

Health systems research

Testing alternative and improved delivery strategies (e.g. community health workers, mobile clinics, mass campaigns) will also help program managers achieve universal coverage. For example, questions exist regarding optimal roles for the public and private sector in improving access and how the roles evolve as the control program reaches certain milestones. This would be impacted by public and private sector capacity in the country and the types of populations targeted. Economic analysis is also needed to assess how different delivery systems affect cost effectiveness.

Behaviour change research

Behavioural research will be necessary to help ensure preparedness for implementation of strategies, particularly surrounding those of new interventions and approaches. Research focused on optimizing behaviour change communication (BCC) and information, education and communication (IEC) approaches, which can improve intervention uptake, usage, and adherence, and on mechanisms for sharing best practice approaches should be developed.

Research for monitoring and surveillance technologies

Several new applications utilizing mobile phone, SMS and PDA technology have the potential to increase frequency and accuracy of data collected. A greater understanding of which tools are most applicable in which settings will be helpful, particularly as surveillance becomes more critical.

Operational and implementation research

Current intervention field effectiveness is often much lower than its potential and varies significantly based on setting. Operational and implementation research activities are helpful in finding out the reasons contributing for such sub-optimal results.

- WHO defines operational research as "the use of systematic research techniques for program decision-making to achieve a specific outcome. OR provides policy-makers and managers with evidence that they can use to improve program operations."
- The purpose of implementation research is to "significantly improve access to efficacious interventions against tropical diseases by developing practical solutions to common, critical problems in the implementation of these interventions".

Some research questions on IVM that can be addressed by operational and implementation are given below:

- What are the barriers to effective universal coverage and use of LLINs (system, political, operational, cultural, household, etc.) and how do we mitigate them?
- What are the optimal LLIN replacement strategies and thresholds, and how do we forecast needs for achieving and sustaining high coverage levels?
- How can we better measure the useful life of LLINs under real life conditions?
- What is the entomological and epidemiological impact of scaled-up LLINs and/or IRS?
- Can combined full coverage of LLINs and IRS push transmission to zero in high-endemic areas of India (under what time frames and strategies)?

The NVBDCP conducts regular therapeutic efficacy studies, insecticide resistance studies, quality assurance of RDTs and population surveys in association with various research agencies, particularly NIMR to face implementation issues.

14. Monitoring and Evaluation

Monitoring is an on-going follow-up of program activities to examine whether these are being implemented as planned and to identify problems at various levels and help decision making where it is most needed. The concept of programme monitoring has evolved from mere monitoring of impact and disease burden to close follow up of inputs, processes, outputs and outcomes. Under the programme, monitoring is done through routine reporting system, supportive supervision and periodic reviews during meetings and field visits.

Evaluation is systematic and objective assessment of the relevance, effectiveness and impact of activities against the established set of goals or objectives. The performance of the program is evaluated by independently conducted periodic surveys and qualitative assessments which provide measurements of a set of predetermined indicators. The program is annually evaluated through Common Review Mission under National Health Mission and periodically evaluated independently through in depth evaluation, Joint Monitoring Mission.

14.1 Routine Reporting

The following reports are submitted on a routine basis as per scheduled timelines for monitoring case detection and management, IVM and programme management.

(a) Case detection and management reports

M-1: Report of malaria surveillance by ASHA / health care provider / health facility
M-2: Slide examination request to laboratory
M-3: Laboratory register of slide examination in laboratory
M-4: Fortnightly report of malaria surveillance from subcentre / PHC / district / State

(b) IVM reports

VC-1: Primary record of IRS
VC-1S: Wall stencil
VC-2: District IRS output form
VC-3: Primary record of bed net delivery and impregnation
VC-4: Bed net delivery and impregnation form
VC-5: District annual stock report on vector control supplies
VC-6. IVM plan - block level

(c) Programme management monitoring report (PMMR)

An overview of the above-mentioned records and reports is provided below:

M-1: Report of malaria surveillance by ASHA / health care provider / health facility. This is the primary record for all suspected malaria cases malaria surveillance. M-1 is to be filled by ASHA/health care provider/ health facility involved in case detection and treatment. Each row in this form corresponds with one patient's record.

The serial number for patients should be started fresh each month. The slide number starts fresh at beginning of every year. Fever cases tested by MPHW's house visits are marked A; and cases reporting to MPHW as P. Cases tested by ASHA/CHV and at PHC are marked P. The lower portion of M-1 is earmarked for recording logistics data.

The ASHA/CHV will fill the M-1 in duplicate after completing records of all patients who reported during the fortnight and forward one copy to the subcentre within 7 days of end of each fortnight. The MPHW compiles M-4-SC by compiling the M-1 of all ASHAs and adding his/her own M-1 details.

M-2: Slide examination request to laboratory. In areas where RDTs are supplied, RDT is done and blood smears are made at the same time. If the RDT is positive, the slide is discarded and if RDT is negative, the blood slide is forwarded to laboratory for examination. Areas which are not supplied with RDTs rely completely on microscopy for diagnosis. The M-2 is filled in duplicate by ASHA/CHV/MPHW when blood slides are sent to the laboratory. The results of microscopy and feedback on smear quality are filled in M-2 by the LT whose effort should be that the results reach back to ASHA/CHV/MPHW within 24 hours of blood smear preparation, for early treatment to be started in positive cases. The results received are entered into the M-1 for its completion by ASHA/ CHV/ MPHW.

M-3: Laboratory register of slide examination in laboratory. M-3 register is the record of slides examined in the PHC laboratory. The register should have separate sections for slides received from each subcentre and for slides received from the PHC-OPD. In each section serial numbers start fresh every year. Details from M-2 are entered serially in the appropriate columns of M-3, along with date of receipt of slide, date of examination and result. The remarks column is used for indicating poor quality of smear, if any, and any other information like reasons of delay in examination.

M-4: Fortnightly report of malaria surveillance from subcentre/PHC/district/state. M-4 is a monthly compilation of data from M-1 forms, village- and subcentre-wise. The MPHW compiles all M-1s received from ASHAs/CHVs in M-4 with aggregates from each provider in a separate row and his own M-1 data in the last row. The M-4 is made in triplicate and two copies are forwarded to the PHC. The subcentre-wise data of all PHCs is entered into the NAMMIS at the district level.

Each level of health care delivery is to be encouraged to analyse data based on these recommendations on a regular basis. All deaths due to malaria should be investigated in detail by an officer no lesser in rank than the DVBDCO or MO-PHC.

VC-1: Primary record of IRS. VC-1 is the house-wise record of spray details spray prepared separately for each village by the spray supervisor/ superior field worker (SFW) and submitted to the MPHW/ health worker within one week of completion of the IRS round. The house-wise log of room coverage is given in the lower portion of VC-1. The VC-1s are submitted by the MPHW to the PHC, where the MO-PHC does a village- and subcentre-wise compilation assisted by the health supervisor.

VC-1S: Wall stencil. VC-1S is the wall stencil on each house in which the date of spray, round number, insecticide used and squad number are entered by the SFW after the spray is completed. The number of rooms sprayed/ total number of rooms are entered against SR/TR.

VC-2: District IRS output form. VC-2 is a village- and subcentre-wise compilation of information from VC-1s received from SFWs. Once the spray is completed in the PHC area, the VC-2 is prepared in duplicate and one copy is submitted to the district within 15 days of completion of spray with the second copy retained at the PHC. The DVBDCO consolidates these reports and sends it to the state; and the State compiles reports and sends it to Directorate of NVBDCP.

VC-3: Primary record of bed net delivery and impregnation. VC-3 is the village level record regarding availability, distribution and impregnation of bed nets house-wise, prepared prior to the onset of the transmission season by the MPHW (M) with assistance from ASHA/AWW/CHVs. The house-wise details of requirement of bed nets, availability in the beginning of the year and distribution of ITNs/LLINs in the current year are entered along with an estimate of number of available bed nets.
The summary of bed net coverage with percentage of houses with at least two effective nets is also entered. The stock status of synthetic pyrethroids is summarized.

VC-4: Bed net delivery and impregnation form. VC-4 is a village/subcentre/PHC wise compilation of bed net impregnation and distribution activities. The village level VC-3s are submitted by MPHW (M) to the PHC where the information is compiled in VC-4 in duplicate; one copy is retained at PHC and the other sent to the DVBDCO; the DVBDCO consolidates these reports and sends it to the state; and the State compiles reports and sends it to Directorate of NVBDCP.

VC-5: District annual stock report on vector control supplies. The VC-5 is compiled by the district furnishing the PHC-wise insecticide usage in a calendar year.

VC-6: IVM plan - block level. The VC-6 is filled at the end of each year giving data from VC-4 on LLIN distribution during the year. The VC-6 of previous years are used for annual planning of LLIN requirements, for example, LLINs with effective life of 3 years which were distributed before 3 years need to be replaced during the current year. LLINs delivered to tribal residential hostels, jhum cultivators and distributed through antenatal care services must also be factored.

Programme Management Monitoring Report (PMMR)

The PMMR is used to monitor progress made on programme processes and management issues. This report gives details of trainings, field visits and reviews conducted as well as the logistics situation. Data on LQAS surveys conducted by MTSs are also included.

The timeline for submission of the report by different levels is mentioned in table 15.1.

Table 14.1 Timeline for submission of reports by different levels

S.No	Report	Timeline
1	M-1: Report of surveillance of fever cases by ASHA / MPHW / health	1st fortnight: 21st of the month 2nd fortnight: 7th of following month
2	M4-SC	1st fortnight: 25th of the month 2nd fortnight: 10th of following month
3	M4-PHC	1st fortnight: 28th of the month 2nd fortnight: 13th of following month
4	M4-District	1st fortnight: 30th of the month 2nd fortnight: 15th of following month
5	M4-State	1st fortnight: 5th of following month 2nd fortnight: 20th of following month
6	VC2-IRS output, PHC	Within 15 days of spray completion
7	VC-2-IRS output, district	Within 30 days of spray completion
8	VC-2-IRS output, State	Within 45 days of spray completion
9	VC-4-Bed net delivery/impregnation, PHC	Within 15 days of activity completion
10	VC-4-Bed net delivery/impregnation, district	Within 30 days of activity completion
11	VC-4-Bed net delivery/impregnation, State	Within 45 days of activity completion
12	PMMR, district	15th day of following quarter
13	PMMR, State	21st day of following quarter

The formats of the case detection and management reports (M-1 to M-4), IVM reports (VC-1 to VC-6) and PMMR are given in annex 15.

14.2 Role of Health Care Staff at Various Levels in Malaria Monitoring

The role of health staff at various levels in monitoring is outlined below.

Village level worker (ASHA/AWW/CHV)

- Maintain record of all fever cases in M-1 and provide the fortnightly report to the subcentre

- Fill M-2 with details on blood slides to be sent to the laboratory for microscopy and arrange for their transportation on the same day and complete the M-2 on receipt of results.
- Bring to the notice of MPHW and MO-PHC any significant increase in malaria/fever incidence during the current fortnight compared to the previous one.
- Assist the MPHW (M) during bed net surveys and filling VC-4.
- Conduct impregnation and distribution of bed nets in targeted villages, fill the VC-4 and submit it to MO-PHC.

MPHW (M)

- Compile all M-1s received from ASHA/CWW/CHV and include data from subcentre and M4-SC fortnightly to the PHC
- Conduct bed net survey prior to the transmission season
- Compare fortnightly subcentre case detection data with those of corresponding fortnight of previous year and inform MO-PHC when as needed

MO-PHC

MO-PHC is in-charge of all malaria prevention and control activities within the PHC area and is the signing authority for all reports furnished by the PHC. His role in reporting includes the following:

- Compile all M-4s received from the subcentres and submit M4-PHC fortnightly to DVBDCO.
- Compile VC-1s received from the SFWs and submit VC-2 to DVBDCO.
- Facilitate bed net survey prior to the transmission season by MPHWs (M) and ASHAs
- Compile information from village level VC-3s into VC-4 and send it to DVBDCO.
- Compare fortnightly subcentre-wise case detection data with those of corresponding fortnight of previous year and take necessary action as needed
- In the elimination phase, decide in collaboration with DVBDCO on case and focus investigation/classification and measures applied as well as report to DVBDCO on each case and focus in the respective PHC area

Health supervisor/ malaria inspector

The health supervisor and malaria inspector assist the MO-PHC in the following reporting activities.

- Compilation of VC-1s received from SFWs into VC-2
- Compilation of VC-3s received from MPHWs into VC-4
- Analysis of all reports generated
- In the elimination phase, assist in case and focus investigation and classification and measures applied in the respective PHC area

Laboratory technician

The laboratory technician is responsible for malaria microscopy and its reporting at the PHC laboratory. His main responsibilities are as follows:

- Enter M-3 with details of all slides received in the laboratory from the PHC- OPD and from peripheral workers - ASHAs/AWWs/CHVs
- Examine all slides at the earliest and arrange for results to reach the PHC-OPD same day and peripheral workers within 24 hours of slide preparation.
- Assist MO-PHC in the compilation of M-4.

District Vector Borne Disease Control Officer (DVBDCO)

The DVBDCO has the following reporting responsibilities executed with assistance from the District VBD control consultant and AMO, if available.

- Compilation of M-4s, VC-2s, VC-4s received from PHCs and submitting the respective district reports and also VC-5 to the State
- Oversee maintenance of VC-6 with yearly log of LLINs distributed
- Coordination with MO-PHCs to ensure bed net surveys are conducted prior to the transmission season and ensuring that the information collected is used for developing the district annual action plan
- Compilation of PMMR every quarter and submission to the State
- Analysis of fortnightly epidemiological data subcentre- and PHC-wise with previous year's corresponding period to assess the malaria situation and take corrective action when indicated.
- In the elimination phase, decide on case and focus investigation/classification and measures applied in the respective PHC areas as well as report to SPO on each case and focus in the respective district.

State Programme Officer (SPO)

The SPO has the following reporting responsibilities.

- Compilation of all district level M-4s, VC-2s, VC-4s, VC-5s and PMMRs and submit the respective State reports to Directorate of NVBDCP by due dates.
- Analysis of fortnightly epidemiological data district-wise with previous year's corresponding period to assess the malaria situation and take corrective action, when indicated
- In the elimination phase, report to the Directorate of NVBDCP at national level on each case and focus in the respective State and measures applied.

National level

The Directorate of NVBDCP, New Delhi has the responsibility of compilation of all State level reports on case management, IVM and programme management; analysis of the data; and providing the feedback to States on the key observations.

The roles and responsibilities of staff at all levels is given in annex 16.

14.3 Supportive Supervision

Supportive supervision is provided in the malaria programme for performance improvement, enhancing motivation, and building sustainability

14.3.1 Performance improvement

Efforts are made to improve the performance of staff at levels by the following.

- Use of SOPs and supervisory checklists for each level of health care provision
- Providing staff with updates on policies or new practices and conducting on-the-job training supported by guidelines, manuals and visual aids
- Supervisory visit schedule communicated in advance to the concerned staff with longer visits planned for low performing health facilities
- Planning visits when patients are available to interview on quality of services
- Discussion on progress on recommendations made during previous visits
- Checking stock position on ground with ledgers/records
- Checking conditions of equipment and storage
- Carry materials, and supplies for the health facility according to requests made or needs identified at previous visit.
- Reviewing the records and providing feedback to the MO and other staff.
- Checking records like M-1, M-2, M-3 and M-4 for correctness, timeliness and completeness.
- Comparing case detection data with the use of logistics, for example, the number of fever cases tested with RDTs and stock position
- Assess the relationship between community and health workers and if it is not good, find out the reasons thereof and take necessary steps to rectify the situation.
- Praise well performing health workers in public
- Work with other health programmes to coordinate supervisory activities
- Schedule the next visit before leaving the health facility

14.3.2 Enhancing motivation

- Praise and give recognition to health workers for what they are doing right
- Involve health workers in planning and encourage health facility supervisors to work together with their staff

- Take part in staff meetings and talk to them about their needs and ambitions
- Act on feedback from the health workers to show that they are trusted
- Organise monthly meetings of health facilities in a district to provide opportunity to health workers to learn novel approaches and strategies as well to serve as a forum to acknowledge their achievements.

14.3.3 Building sustainability

- Collate data on gains resulting from supportive supervision, such as improved performance, improved IRS, better treatment etc.
- Develop an approach to increase supportive supervision as a routine within the health facility
- Staff can be motivated to conduct regular self-assessments to monitor their performance

The schedule for staff at various levels to carry out visits for supportive supervision is given in table below.

Table 14.2 Schedule for staff to carry out supportive supervision visits

Level	Staff	Schedule
PHC	MO PHC	• Visit all subcentres under PHC once a month, including remote villages and interview ASHA and 2 patients treated by the ASHA in the last one month and countercheck from her records; and during visit, supervise if IRS is going on in those villages
	MPHS (Male & female)	• Visit all subcentres under PHC as per schedule, including remote villages and interview ASHA and 2 patients treated by the ASHA in the last one month and countercheck from her records; and during visit, supervise if IRS is going on in those villages
CHC/Block PHC/Sub-district hospital	MO	• Visit all PHCs and microscopy centres in the area once a month • Visit all subcentres once in 3 months and include remote villages and interview ASHA and 2 patients treated by the ASHA in the last one month and countercheck from her records, supervise if IRS is going on in those villages • Monitor sentinel sites once a month
	MTS	• Visit all PHCs and microscopy centres in the block once a month • Visit all subcentres once in 2 months and include remote villages and interview ASHA and 2 patients treated by the ASHA in the last one month and countercheck from her records

Level	Staff	Schedule
		• Visit all villages once in 6 months • Supervise IRS rounds, especially in remote and operationally difficult areas • Visit sentinel site(s) in the block once a month
	MPHS (Male & female)	• Visit all subcentres under CHC as per schedule, including remote villages and interview ASHA and 2 patients treated by the ASHA in the last one month and countercheck from her records; and during visit, supervise if IRS is going on in those villages
District	DVBDCO	• Visit all PHCs and microscopy centres in the district once in 3 months, including 2-3 subcentres during each visit. • Visit all sentinel sites in district once a month • Check laboratory functioning during each visit to microscopy centre and sentinel site • During subcentre visits, include remote villages and interview ASHA and 2 patients treated by the ASHA in the last one month and countercheck from her records; and during visit, supervise if IRS is going on in those villages • Supervise IRS rounds in the district, especially in remote and operationally difficult areas
	VBD consultant	• Visit all PHCs and microscopy centres in the district once in 2-3 months • Visit all sentinel sites in the district once a month • Visit all subcentres once in 6 months • During visit to subcentres, try to visit remote villages and interview the ASHA and 2 patients treated by ASHA in the last one month (checked from her records) • To cover all PHCs of the district during spray inspection/supervision in each round of spray. To visit and observe at least 5 to 10 villages every week to check the quality of spray
State	SPO	• Visit 1-3 districts every month covering all districts once in a year
Regional office	RD	• 1 district to be visited every month

The checklist for use by staff at various levels for their supervisory visits is given in annex 17.

The participation of highest level administrative officials in programme monitoring facilitates better performance, for example, the health secretary should be involved in programme reviews at state level and the district collector at district level.
The checklist for use by these administrative officials is given in annex 18.

Data quality

The accuracy, completeness and timeliness of data can only be ensured if there is a system of verification in place. Ensuring the quality of data is the responsibility of supervisory staff and the signing authority of the reports. Data should be verified during visits to villages, subcentres, PHCs and districts. During field visits individual patient records in M-1 should be verified for correctness by visiting the patients diagnosed and treated in the previous month. PHC M-4 should be checked for validity by perusing M-4 of respective subcentres.

14.4 Indicators Used for Measuring Progress and Impact

The main indicators that are used in the programme based are listed below. Each level of health care delivery is encouraged to analyse these data and take necessary action as indicated. The main disease incidence indicators like API, TPR, Pf% etc. can be calculated from the data available in M-4 for any level, from village to national level. Any indicator showing an increase or decrease of more than 5% compared to corresponding period of previous year needs to be looked into and the reason for it ascertained. Sudden increase of fever incidence in community, OPD fever rate and malaria incidence along with rise in TPR above 5% may indicate an impending outbreak. When assessing IRS or ITN for universal coverage, though 100% coverage is considered optimal, at least 80 % utilization by targeted population should be the acceptable cut off.

Indicators for case detection and management

- Disease burden and impact
    - Fever cases
    - Malaria cases
    - Pf cases
    - Deaths due to malaria
    - Annual parasite incidence (API)
    - Annual falciparum incidence (AfI)
    - Test positivity rate (TPR)/Slide positivity rate (SPR)
    - Test falciparum rate (TfR)
    - Pf percentage
- Surveillance
    - Monthly blood examination rate (MBER)
    - Annual blood examination rate (ABER)
- Case management
    - Number of Pf cases treated with ACT
    - Number of severe malaria cases treated with injectable artemisinin derivatives
- Management
    - Percentage of ASHAs/AWW/CHVs equipped with RDKs

Indicators for IVM

- Process
    - Percentage of spray equipment in working condition
    - Percentage of spray squad use against requirement
- Output
    - Number of bed nets treated
    - Number of ITNs/LLINs distributed
    - Volume of insecticide used for impregnation per bed net
    - Amount of insecticide used for IRS
- Outcome
    - Percentage of eligible population covered by ITNs/LLINs
    - Percentage of targeted population covered by ITNs/LLINs
    - Percentage of eligible villages with more than 80% population coverage with ITNs/LLINs
    - Percentage of eligible population covered by IRS
    - Percentage of targeted population covered by IRS
    - Percentage of targeted rooms covered by IRS

I**ndicators for programme management**

- Input
    - Numbers of RDTs and ACTs planned vs received and used
    - Percentage of various staff (ASHA/MPHW/MTS/LT/DVBD consultant) in position vs sanctioned
- Process
    - Percentage of MPHW/ASHA/CHV trained in use of RDT and ACT
    - Percentage of diagnostic facilities functional with microscopy
    - Percentage of facilities/providers (PHC/SC/MPHW/ASHA/AWW/CHV) reporting stock-out of antimalarials
    - Number of BCC activities carried out (Numbers of each type of activity)
- Outcome
    - Percentage of fever cases who were diagnosed and treated for malaria within 24 hours
    - Percentage of households in which beneficiaries slept under ITN/LLIN the previous night
    - Percentage of PHC areas where more than 80% of beneficiaries slept under ITN/LLIN the previous night

The consolidated list of the indicators to be analysed at each level is given in annex 19.

14.5 Post-2015 Indicators

In line with the Global Technical Strategy for Malaria 2016-2030, India should ensure that a baseline of at least the following 12 indicators is available for 2015 so that it is possible to monitor progress through this strategy.

Outcome indicators

- Proportion of population at risk who slept under an ITN/LLIN the previous night
- Proportion of population at risk protected by IRS within the past 12 months
- Proportion of patients with suspected malaria who receive a parasitological test
- Proportion of patients with confirmed malaria who receive first-line antimalarial treatment according to national policy
- Proportion of expected health facility reports received at national level
- Proportion of malaria cases detected by surveillance systems
- Proportion of cases investigated (in elimination phase)
- Proportion of foci investigated (in elimination phase)

Impact indicators

- Parasite-prevalence: proportion of the population with evidence of infection with malaria parasites
- Malaria case incidence: number of confirmed malaria cases per 1000 persons per year
- Malaria mortality rate: number of malaria deaths per 100 000 persons per year
- Number of States that have newly eliminated malaria since 2015

14.6 Programme evaluation

Central level evaluation is now routinely conducted each year, twice during the transmission season, coinciding with the two rounds of spray. During this period teams are sent to the selected highest endemic districts of the country comprising of members from Directorate of NVBDCP, ICMR and NIMR institutes, regional offices, state offices and districts.

The specific objectives of this evaluation are as follows:

- To assess the status of programme implementation with focus on activities of ASHAs and RDT/ACT utilization
- To evaluate the IRS preparatory activities and estimate the coverage
- To assess distribution and utilization of bed nets

The Centre selects the highest endemic districts to be visited for evaluation prior to the transmission season based on the API, ABER and Pf% of the previous year. Two visits

are made by the visiting team coinciding with the two IRS rounds. In each of the selected districts, two high-burden PHCs are selected and from each of these PHCs two subcentres and from each subcentre area two villages chosen. Selection of villages is done in a manner that in one village the IRS is being done on the visit day (for concurrent evaluation) and in the second village, IRS has been completed (for consecutive evaluation). The ASHAs of each selected village are interviewed and their records verified to evaluate their performance. PHCs and subcentres are also selected in such a manner that bed nets were distributed during the season and during the village visits, about 50% of households in a village are selected on a random basis to assess the bed net utilization. The ASHAs of each selected village are also interviewed.

Evaluation is conducted based on the completed checklists and indicators. The reports of the teams are submitted to NVBDCP, where compilation and review of programme implementation is done. The states should conduct similar evaluations at their level to strengthen their monitoring efforts.

Periodic large scale evaluations of programme are also carried out by independent observers. The Directorate of NVBDCP calls for an independent agency to undertake such reviews which comprise of an in-depth assessment of all programme aspects like case diagnosis and management, treatment seeking behaviour of the community, coverage of vector control interventions and community acceptance, impact of BCC activities on community awareness and practices. These large scale evaluations are conducted usually at 5 yearly intervals.

In-depth reviews of the programme is done through Joint Monitoring Missions (JMMs) partnered by WHO and NIMR which reveal shortcomings in programme policies and implementation and enable improvements to be made in programme design.

15. Programme Planning and Management

The Directorate of NVBDCP's action plans are developed as a bottom-up process which begin annually at the district level and culminate as the final plan with the guidance of the MOH&FW. The DVBDCO develops the district plan based on inputs received from MO-PHCs and the SPO/SVBDCO develops the State plan based on the district plans. These plans should be based on epidemiological parameters related to malaria, programme guidelines, eligibility criteria and availability of resources. The State/UT plans should be discussed with Directorate of NVBDCP in December and submitted by 31st December. The national level plan developed by the Directorate of NVBDCP is discussed under the NHM and the finalized plan is approved under planned expenditure by MOH&FW by 28th February of the following year. Funds are released to the States and UTs keeping account of the balance available with them.

High-risk areas are identified and prioritized based on criteria defined in earlier sections. Every annual plan should be based on the experience of the previous year. The district malaria staff should closely review all available relevant information and analyse the malaria situation in the district and make the plan with involvement of all important stakeholders in the district.

The annual plan provides for central assistance to the States for antimalarial drugs, insecticides (DDT and synthetic pyrethroid liquid) and larvicides. Malathion technical for use in control of malaria epidemics is also provided by the centre. States are required to procure Malathion 25% and synthetic pyrethroid WDP for use in areas where the malaria vector is resistant to DDT. Primaquine and Quinine sulphate are also decentralized for procurement by States. The programme is implemented by the States who also bear the operational costs, including wages for contract labour for IRS. However, the central government provides full cash assistance for spray wages to NE States and union territories.

Microplanning is required for eligible villages to assess requirements of RDT, ACT, insecticides, ITN/LLIN etc. and their distribution. Though the initial planning is based on the estimated requirement of resources, implementation is tailored according to the resources made available. For example, if the initial planning is made for bed nets to cover a population of 250,000 in high-priority areas in a district and only 50,000 bed nets to cover 125,000 population are made available, the DVBDCO will select for bed net distribution those subcentre areas where IRS is operationally very difficult to carry out and the community has a good acceptance of bed nets. The remaining population and villages can be targeted in the next annual plan.

The annual plan consists of following descriptions:

- Population
- Status of health facilities

- Human resource
    - District wise epidemiological situation, identification of high risk areas and populations
- Status of GIS mapping
- Information on outbreaks in the previous year
    - Estimation of RDT requirements and their distribution in the current year.
    - Estimation of requirement for the next plan year.
- Estimation of ACT requirements in the current year and for the next plan year
- Planning for bed net distribution and impregnation.
- Microplanning for IRS
- Training activities
- BCC activities
- Commodity requirement
- Cash assistance
- SWOT - Strength, Weakness, Opportunity, Analysis

The district level action plan formats for calculation of requirements of RDT, bed nets and IRS are given in annex 20. The format for the complete State level annual action plan is given in annex 21.

Governance and accountability action plan (GAAP)

The MoH&FW is fully committed to improve the governance and accountability in all centrally sponsored programs including the NVBDCP by ensuring efficient program design and management, sound financial management and better competition and transparency in procurement and supply of health sector goods and services required to deliver high quality services. MoH&FW has developed the GAAP to address critical operational concerns related to program management, financial management and procurement in programmes. The GAAP is a dynamic document and will be strengthened, as necessary, based on lessons learnt during the implementation of NVBDCP and other health sector projects.

While MoH&FW has the overall responsibility for the GAAP, the Directorate of NVBDCP will be responsible for implementing program-specific activities and will also be the nodal point to coordinate with the states and other agencies for effective implementation of the GAAP. States will be responsible for implementing the relevant actions by district and sub-district level implementing entities.

Various institutional mechanisms such as NVBDCP technical teams with state focal points (for technical guidance, program management and implementation oversight), financial management group (for financial management), procurement unit (for procurement of services, monitoring of procurement undertaken by procurement agent and supply chain management) and the empowered procurement wing (for establishment and

updating of broader procurement policies and standards for the sector including procurement capacity building of states) have been established for this purpose.

Risks related to procurement such as poor market response, procurement delays and higher costs, submission of forged documents to win contracts, delay in bid evaluation, inadequate / improper bid evaluation, poor quality of commodities, delays in release of payment, sub-optimal use of commodities provided under the project, inadequate disclosure of project information and citizen oversight, weak mechanisms for client feedback and program accountability especially for tribal and vulnerable groups, weak complaints handling mechanism, inadequate supply chain and storage arrangements etc. will be taken care of under this plan.

16. Financial Management

The tentative budgetary requirement is the essential component of the annual action plan. After approval of the plan in February, funds are released to the State Health Societies (SHS) through treasury route. Funds are released in two instalments, the 1st Instalment is 75% of the approved budget taking into consideration the unspent balance at the end of the previous financial year.

The documents that should be submitted by States/UTs for release of first instalment are:

- Audited report along with UC (in prescribed format GFR19A**) of the preceding year (e.g. for 1st release of 2016-17, audited report of 2014-15 to be submitted)
- SOE of the previous year (e.g. for 1st release of 2016-17, SOE of 2015-16)
- Bank/cash balance as on 1st April of the year (e.g. for 1st release of 2016-17, balance as on 1st April 2016)

The documents to be submitted by States/UTs for release of second instalment are:

- Audited report along with UC for the previous year (e.g. for 2nd release of 2016-17, audited report of 2015-16)
- SOE for the current financial year

SOEs will be submitted on a monthly-basis by district health societies (DHS) to SHS (State health society) which in turn after consolidating expenditure statement send it to Directorate of NVBDCP by the 20th of the following month.

The books of accounts and working of the financial management system of State societies shall be reviewed / monitored by visits of finance personnel of Directorate of NVBDCP regularly.

The following books are to be maintained by the SHS and DHS.

- Cash book (double column)
- Journal book
- Ledger
- Budget control register
- Advance register
- Fixed assets register

Cash book must be closed on daily basis even if no transaction has been executed in that particular day.

The SHS shall furnish its consolidated quarterly fund position covering fund position of the district societies to the Directorate of NVBDCP within 10 days of the close of the quarter to enable the Directorate to consider further release of funds in a timely manner.

Audit of accounts

The accounts shall be audited annually by the firm of chartered accountants empanelled by Comptroller and Auditor General (CAG) of India. The books of accounts and related records shall be kept updated regularly by the SHSs and DHSs for the SHSs to send consolidated annual audit report incorporating audited accounts of DHSs to the Directorate of NVBDCP.

The following documents are to be submitted by the auditor.

- Receipts and payments account
- Income and expenditure account
- Balance sheet
- Accounting policy
- Schedule of fixed assets
- Schedule of outstanding advances recoverable
- Schedule of sundry debtors/creditors (if applicable)
- Bank reconciliation statement along with balance statement from bank
- UC in the prescribed format. (GFR-19A)

The format of utilization certificate (GFR-19A) and important activities and schedule for external audit as per NHM is given in annex 22.

17. Procurement and Supply Chain Management

The main objectives of logistics and supply chain management are planning, acquisition, storage, movement and control of drugs and commodities, so as to optimize resources, personnel, physical facilities and capacity. It is a dynamic approach for material control seeking to provide right materials, of right quantity and right quality, in right condition, at the right time and from the right source at right cost to ensure a reliable and uninterrupted supply of good quality materials at service delivery points or to the end-users.

The programme managers dealing with logistics and supply chain management should know:

- When to order or issue
- How much to order or issue
- Maintain appropriate stock levels of all drugs and commodities to avoid stock-outs and overstocking which can lead to product loss due to expiry
- Make proper storage arrangements for stocks
- Make proper documentation of the inventory

Proper Inventory control systems helps to allow re-supply decision based on current consumption, stock in hand; established buffer stock levels based on lead times and order intervals. When the demand is unpredictable it is recommended to consider increasing the buffer stock (safety stock), reducing lead times (time taken right from placing the orders to delivery of supplies) by hastening the administrative process, close monitoring of procurement process and follow-up with the suppliers wherever there is delay in supplies. Inventory control system helps to determine quality of products and timing of facility orders and delivery schedules, so as to ensure uninterrupted supply of quality products. This is crucial for the management of drugs, commodities and other perishable items and is required to be managed with due diligence and accuracy at State and district level.

States and districts should minimize the risk of stock-outs through effective management of logistics systems, which should include appropriate economic order quantity, buffer/safety stock, procurement period, stores and inventory and product demand. These procedures should include the establishment and maintenance of reliable inventory management, “First-Expiry/First-Out” (FEFO) stock control systems, internal audit/monitoring systems, and good governance structures.

17.1 Steps Involved in Logistics/Supply Chain Management

After notification of Award (NOA) to the supplier, the following activities are carried out at the consignee level i.e., States to deal with the drugs and commodities being procured by NVBDCP and distributed to States/districts/CHC/PHC/Subcentre.

- Supplier informs all consignees about the quantities of items and approximate dates of their arrival
- Consignee issues road permits/ octroi exemption certificates to the supplier
- Consignee receives supplies and issues Goods Receipt and Acceptance Note (GRAN)
- Consignee makes stock entries and documentation
- Consignee physically verifies the received goods and issues Final Acceptance Certificate (FAC)
- Drugs and commodities stored as per norms in the technical specifications
- Stores distributed to the districts, CHCs, PHCs, subcentres and ASHAs as per NVBDCP guidelines
- Stores utilized as per FEFO principle
- Monitoring done for excess stocks and short-expiry stocks which are diverted after getting approval from NVBDCP

17.2 Challenges

The challenges in logistics and supply chain management are as follows.

- Delay in issue of road permits, GRAN or FAC
- Limited availability of transport due to reasons including for maintenance and repair and transport shared across other programs
- Non-availability of storage space
- Additional products added to already burdened distribution systems
- Non-availability of dedicated staff for this activity, lack of motivation and lack of supervision
- Lack of training and capacity building
- Improper documentation
- Non-availability of adequate funds for improving supply chain management and upgradation of existing stores and construction of new stores.
- Stock-outs due to improper planning or over-stocking leading to expiry

To address these challenges and issues, States are required to take actions given below.

- Timely issue of road permit, GRAN/consignee receipt/consignee acceptance certificate and FAC
- Reporting of stock position/status to Directorate of NVBDCP every quarter
- Monitoring of stock status every month in the DVBDCO meeting so as to avoid any stock-outs, or any other issues related to supply chain management and forward the copy of minutes of the meeting and action to be taken/being taken for the issues on supply chain management
- Insist all districts/CHCs/PHCs to monitor stock position and report the same to the State every month
- Monitor the quality of the drugs and commodities and report to the Directorate

of NVBDCP in case of any discrepancy

- Regular monitoring of expiry status of the drugs and commodities and instruct officials to follow FEFO principle so as to use the products judiciously
- Regular monitoring of storage conditions and provide necessary guidance and instructions to ensure proper storage within the available resources

17.3 Commodity Receipt and Record Maintenance

- Once the order is placed to the firm a copy is marked to the consignees (state/GMSD) to issue road permits and to ensure the availability of space before delivery.
- Once road permits are issued by the consignees, supply will be started
- After the supplies are received by the States, they should issue GRAN to the supplier as well as to the procurement agency immediately to avoid any demurrage charges of the goods and document discrepancy, if any.
- Consignee should issue FAC after detailed physical verification of the quantities, specifications, batch number, expiry date, delivery schedule and certificate of quality control test results in conformity with the standards as provided in the technical specifications and maintain it in the stock register with signature/verification report of the receiving authority within one month time.
- Stats should make allotment to districts as per their technical requirement.
- States should fill up the stock position statement by compiling the data received from their districts and submit it to the Directorate every quarter. They should also issue the quarterly consumption certificate in this format and finally the annual consumption certificate with details like consumption, stock in hand, further requirement, any transfer or expired items etc.
- If the State/district feels necessary, they may randomly check the quality of the items as per the State procedure by an independent, authorized testing laboratory and document the test reports. If any discrepancy is noticed, they should immediately inform the Directorate for further necessary action.

The checklist for receiving drugs/commodities, checklist for physical verification, statement on stock of drugs and commodities, format for GRAN, final acceptance certificate and guidelines for storage of drugs and commodities are given in annex 23.

Annexures

Annex 1

API and *P.falciparum* rates in the country (State/UT wise), 2014

(In ascending order of API for States/UTs classified category-wise)

Category 1 States and UTs	API	Pf %	Category 2 States	API	Pf %	Category 3 States and UTs	API	Pf %
Lakshadweep	*0.00*	*0*	Bihar	0.02	34	*Andaman &*	*1.20*	*20*
Delhi	*0.01*	*0*	Tamil Nadu	0.12	4	Madhya Pradesh	1.26	43
Himachal	0.02	1	Telangana	0.15	89	*Dadra & Nagar*	*1.64*	*13*
Punjab	0.04	1	Uttar	0.20	1	Jharkhand	2.94	45
Jammu &	0.05	7	Karnataka	0.27	9	Arunachal	4.30	38
Kerala	0.05	17	West Bengal	0.28	19	Chhattisgarh	4.72	84
Manipur	0.05	50	Andhra	0.41	74	Odisha	9.08	87
Puducherry	*0.06*	*4*	Assam	0.44	77	Meghalaya	12.52	95
Chandigarh	*0.11*	*0*	Maharashtra	0.46	48	Tripura	13.27	97
Uttarakhand	0.12	8	Gujarat	0.66	15	Mizoram	20.74	91
Haryana	0.17	1	Nagaland	0.96	33			
Sikkim	0.17	51						
Rajasthan	0.20	4						
Daman & Diu	*0.20*	*7*						
Goa	0.55	5						

Note: Union territories are shown in italics.

It is seen from above table, that category 1 States/UTs generally have a very low proportion of *P. falciparum* cases except Kerala (17%), Manipur (50%) and Sikkim (51%). On the contrary, category 3 States/UTs, have a high *P. falciparum* proportion except the UTs, Andaman & Nicobar Islands (20%) and Dadra & Nagar Haveli (13%) which have a low *P. falciparum* rate.

States with high *P. falciparum* or *P. vivax* proportions require different approaches for malaria elimination which is discussed in section 2 of the manual.

Annex 2

Stratification of States and UTs based on API of their districts

S.No	State/UT	Total number of districts / reporting units	Number of districts/reporting units with API				
			< 1.00	1.00 to 1.99	2.00 to 4.99	5.00 to 9.99	10 & above
1	Andaman & Nicobar	3	2	0	0	0	1
2	Andhra Pradesh	13	10	3	0	0	0
3	Arunachal Pradesh	16	1	2	6	6	1
4	Assam	27	23	1	2	1	0
5	Bihar	38	38	0	0	0	0
6	Chandigarh	1	1	0	0	0	0
7	Chhattisgarh	27	9	1	5	5	7
8	Dadra & Nagar Haveli	1	0	1	0	0	0
9	Daman & Diu	2	2	0	0	0	0
10	Delhi	1	1	0	0	0	0
11	Goa	2	2	0	0	0	0
12	Gujarat	41	34	4	3	0	0
13	Haryana	21	21	0	0	0	0
14	Himachal Pradesh	10	10	0	0	0	0
15	Jammu & Kashmir	12	12	0	0	0	0
16	Jharkhand	24	5	4	10	3	2
17	Karnataka	34	31	2	0	0	1
18	Kerala	14	14	0	0	0	0
19	Lakshadweep	1	1	0	0	0	0
20	Madhya Pradesh	50	25	12	11	2	0
21	Maharashtra	36	33	2	0	0	1
22	Manipur	12	12	0	0	0	0
23	Meghalaya	7	1	0	1	1	4
24	Mizoram	9	1	0	3	0	5
25	Nagaland	12	7	3	2	0	0
26	Odisha	30	8	1	3	3	15
27	Puducherry	4	4	0	0	0	0
28	Punjab	22	22	0	0	0	0
29	Rajasthan	33	33	0	0	0	0
30	Sikkim	4	4	0	0	0	0
31	Tamil Nadu	43	42	1	0	0	0
32	Telangana	10	9	1	0	0	0
33	Tripura	8	2	0	1	2	3
34	Uttar Pradesh	75	73	1	0	1	0
35	Uttarakhand	13	13	0	0	0	0
36	West Bengal	21	20	0	1	0	0
	Total	677	526	39	48	24	40

Annex 3

Key for epidemiological classification of malaria cases[12]

1. How was the case contracted?
   - By blood — **Induced case**
   - By mosquito — Go to 2

2. Where was the case contracted?
   - Outside the country — **Imported case**
   - In this place — Go to 3

3. Which parasite caused the case?
   - *P. vivax* / *P. ovale* — Go to 4
   - *P. falciparum* / *P. malariae* — Go to 5

4. When was the case contracted?
   - Long ago (e.g. from 6 months to 3 years ago) — **Relapsing case**
   - Recently (e.g. up to 6 months ago) — Go to 5

5. From whom was the case contracted?
   - From an imported case — **Introduced case**
   - From any other case — **Indigenous case**

[12] Source: *Guidelines on the elimination of residual foci of malaria transmission*. Cairo, WHO Regional Office for the Eastern Mediterranean, 2007 (EMRO Technical Publications Series, No. 33): 24-28, 46. To be adapted per context.

Annex 4

Malaria case investigation form

Part I

Case ID: …….. /…….. /…….. /…….
Year / State code / district code / case number

Case history
Date history taken: History provided by: Relation to patient:
Name of patient:
Sex: (If female, pregnant or not) Age: Weight:
nationality: Full present home address:
Phone number: Alternative number:
Species detected:
Date of onset of fever
Symptoms:
Complications: If yes, specify
Type of surveillance
Passive case detection/Active case detection/Contact survey/Population based survey
Tool for Diagnosis- Bivalent RDT/ Microscopy
Name of health facility/ provider
RDT Performed by:
Date of RDT: Result:
Manufacturer of test: Batch number:
Microscopic examination Performed by :
Laboratory name: Location:
Date Staining method:
Plasmodium species: Parasite density:
Gametocytes present (for *P. falciparum* only) Yes / No
Molecular testing and polymerase chain reaction results
Performed by: Date:
Geographical origin of infection:
Link to previous attacks:
Drugs given for antimalarial treatment: Dosages of drugs given: Dates from ……..to …….
Treatment outcome:
Previous clinical episodes:
Date: Locality:
Laboratory test results:

Part II

Where, how and from whom did the infection possibly take place?
Length of residence at present home address:
Current occupation: Place of work:
Recent travel history to known endemic area
Recent (within 4 weeks)contact with known imported malaria cases (provide details):
Travel to foreign endemic country
Type of preventive measures taken during the above-mentioned travel to endemic areas/ countries: Personal protective measure/ LLIN/ Chemoprophylaxis/ Others, specify
If chemoprophylaxis taken, drug name, dose and duration:
Blood transfusion/ organ transplantation within past twelve months: Yes / No
Entomological investigation Date of investigation: Anopheles species detected at breeding sites? Yes / No Type and location of breeding sites where Anopheles were detected …… Type and location of potential breeding sites for Anopheles …… Other entomological monitoring activities undertaken? Yes (specify)/ No Summary of activity and results: …… ……..

Part III (to be completed 4 weeks after treatment)

Please list all prescription and over the counter medicines the patient had taken during the 2 weeks before starting their treatment of malaria	
Please list all prescription and over the counter medicines the patient had taken during 4 weeks of starting their treatment of malaria	
Did all signs or symptoms of malaria resolve without any additional malaria treatment within 7 days after treatment start?	
Did the patient experience any adverse events within 4 weeks after receiving the malaria treatment	

Annex 5

Key for operational classification of malaria foci[13]

1.	Are the conditions suitable for the transmission of malaria? • No, none throughout the year • Yes, for a period that is sufficient for the maturation of sporozoites	**Pseudo-focus** Go to 2
2.	Is there an evidence of current transmission or a history of recent transmission (e.g. during the past two calendar years*)? • No • Yes (presence of introduced and/or indigenous cases)	Go to 3 **Active focus**
3.	Are cases present? • Yes • No	Go to 4 **Cleared-up focus**
4.	Which categories of cases present? • Only imported or induced or relapsing • Other categories (introduced and/or indigenous) also present	**Potential focus** **Active focus**

[13] Adapted from: Malaria Elimination - A Field Manual for Low and Moderate Endemic Countries. WHO. 2007 [To be further adapted per context].

Annex 6

Malaria focus investigation form

Basic information

Name of the focus: (city, town, village, hamlet):

Subcentre: PHC: Block:

District: State/UT:

Geographical location

Description of the locality

Type of environment in relation to possible receptivity (e.g. urban/rural, altitude, main geographical features) and vulnerability (e.g. close to endemic areas across international/ State border) ……...
……
……
……

Type of population in relation to possible vulnerability (e.g. migration patterns, presence of relatively large numbers of temporary workers, typical travel histories, etc.) ……..
……
……
……

Map available

Geographical map of focus and its limits ……..…….
……
Location of health facilities ……..…….
……
……
Vector species – possible breeding sites marked for presence/absence of vector larvae
……..…….
……
……
Location of households with malaria cases during past three years …….
……
……

Geographical reconnaissance information

Total number of houses and their inhabitants ……...
……
Map with houses, health units and other important structures as well as access routes
……
……

Vector control interventions applied
Type of intervention ……...
Date carried out ……..

Results of surveys, including active case detection……..
……
Number of reported malaria cases during past five years……
Relationship of locality to the malaria case that prompted focus investigation (in time, space and circumstances, e.g., the person's place of residence, work, etc.)…….
……

Status of focus

Operational classification of focus using foci classification key ……
……

Names (including rank/title) **of responsible officers** (vector control, epidemiology)…….
……
……
……

Follow-up actions taken ……
……
……
……
……

Date form completed ……

Name (including rank/title) **of principal investigator** ……..
……

Signature of principal investigator ……

Annex 7

Bionomics of Malaria Vector Mosquitoes of India

An. culicifacies

Distribution. Widely distributed in India except in Andaman and Nicobar Islands and Lakshadweep. Occurs sporadically in NE States.

Breeding places. Rainwater pools and puddles, burrow-pits, riverbed pools, irrigation channels, seepages, rice fields, wells, pond margins, and sluggish streams with sandy margins. Extensive breeding is generally encountered following monsoon rains.

*Resting habits***.** Rests during daytime in human dwellings and cattle sheds.

*Biting time***.** Throughout the night but peak biting occurs from 19.00 to 04.00 hrs.

*Feeding habits***.** Zoophilic, but when densities build up relatively larger numbers feed on human beings.

Flight range. About 1-3 Km.

Susceptibility to insecticides. Resistance to DDT and Malathion encountered in Gujarat and Maharashtra, isolated pockets of Andhra Pradesh, Karnataka, Tamil Nadu and Haryana. It continues to be susceptible elsewhere to DDT and malathion and is highly susceptible to synthetic pyrethroids.

Relation to disease. Most important vector of rural malaria in the plains of North-Western and peninsular India, including the Southern states of Tamil Nadu, Andhra Pradesh and Karnataka. The species is associated with unstable malaria and has been responsible for outbreaks/epidemics of malaria when mosquitogenic conditions build up due to excessive rains or floods or other natural events.

An. fluviatilis

Distribution. Widely distributed in foothill areas in both peninsular and North Eastern India.

Breeding places. Typically in slow running streams, seepages and irrigation channels; also recorded from rice fields and shallow wells. During heavy rains the breeding is often flushed out.

Resting habits. Rests indoors in human dwellings and cattle sheds.

Biting time. Generally enters houses at dusk and completes feeding before midnight with peak biting time from 2100 to 2300 hrs.

Feeding preferences. In general highly anthropophilic; but may be mainly zoophilic in Northern India.

Flight range. Limited flight range.

Susceptibility to insecticides. Highly susceptible to DDT, Malathion and synthetic pyrethroids.

Relation to disease. Primary malaria vector of malaria in foothills. Most important vector in NE States, Odisha, Jharkhand and Chhattisgarh where it may maintain extended transmission in conjunction with *An. culicifacies*.

An. minimus

Distribution. Restricted to NE States.

Breeding places. Shaded slow flowing streams with grassy margins, swamps, ditches, channels, shallow earth wells; occasionally found to breed in burrow-pits, rice fields and seepages from flowing water.

Resting habits. Rests in houses and cattle sheds, preferring to rest on the lower portions of walls.

Biting time. Peak biting activity occurs from 18.00 to 19.00 hrs outdoors and 24.00 to 02.00 hrs indoors. Biting time may vary from locality to locality and seasonally.

Feeding habits. A highly anthropophilic species, and as a consequence a very efficient vector of malaria.

Flight range. Normally 0.5 Km but can disperse up to 2 Km from the original locality.

Susceptibility to insecticides. Highly susceptible to DDT and other insecticides.

Relation to disease. Primary vector of malaria in North-East India where it maintains perennial transmission in concert with other vectors, *An. dirus*, and *An. fluviatilis*.

An. philippinesis

Distribution. West Bengal, NE States and Andaman and Nicobar Islands.

Breeding places. Tanks, swamps, ditches, rice fields, pools, leaf axils, shaded lake margins, inundated drains and water bodies with generally good growth of vegetation.

Resting habits. During daytime rest in cattle sheds and human dwellings.

Biting time. Biting outdoors and indoors throughout night with two biting peaks from 20.00 to 22.00 hrs and 02.00 to 04.00 hrs.

Feeding habits. Predominantly zoophagic but also bites human beings.

Flight range. Normally up to 0.8 km.

Susceptibility to insecticides. Susceptible to all insecticides in use.

Relation to disease. It was a major vector of malaria in deltaic West Bengal. The species has also been incriminated as vector in North Eastern India.

An. dirus

Distribution. Restricted to the forested areas of all NE States.

Breeding places. Pools and rain water collections in deep forests and forest fringes, stream margins with decaying organic matter, and animal foot prints during high monsoon.

Resting habits. Enters human dwellings to bite and rest but has a tendency to leave houses soon after blood meal.

Biting time. Peak biting time is from 22.00 to 02.00 hrs.

Feeding habits. High preference for human blood but also bites monkeys, other primates and cattle.

Flight range. Varies from 1.0 to 2.5 Km

Susceptibility to insecticides. Susceptible to DDT and other insecticides used in the control programme.

Relation to disease. Primary vector of malaria in forest and forest margins of NE States. It is part of a multiple-vector system in NE States maintaining stable malaria transmission.

An. stephensi

Distribution. Throughout India except at higher altitudes; found sporadically in the North-East.

Breeding places. Wells, overhead and ground-level water tanks, cisterns, rain water collections in roof gutters, peridomestic containers, and underground water storage tanks. In Rajasthan desert it breeds and rests in water storage tanks called ‘Tankas’ in the rural areas

Resting habits. Rests in human dwellings and cattle sheds. Inside human dwellings, it may rest on hanging objects, behind curtains etc. Outdoor resting has been observed in wells and underground cement tanks.

Biting time. Biting varies from area to area and seasonally, but peak biting activity is generally from 22.00 to 24.00 hrs.

Feeding habits. An indiscriminate feeder and bites both man and animals.

Flight range. Limited flight range in urban areas but in rural areas flight range may be up to 3 Km.

Susceptibility to insecticides. Susceptible to organophosphorus larvicides used under Urban Malaria Scheme in India.

Relation to disease. Most important vector of urban malaria, although in peri-urban (semirural) areas, transmission may also be supplemented by *An. culicifacies*. It is also a vector of rural malaria in Rajasthan. It has been responsible for malaria epidemics in urban areas, focal outbreaks in project areas and construction sites. Antilarval measures can control the vector population effectively.

An. annularis

Distribution. All over the country except Andaman and Nicobar and Lakshadweep islands.

Breeding places. Still waters with abundant vegetation in a variety of water bodies; also breeds in wells, moats, tanks, burrow-pits, rice fields and other water bodies such as lakes and stream margins with vegetation.

Resting habits. During day time rests in houses, cattle sheds and mixed dwellings, and also rests outdoors in small numbers.

Biting time. Peak biting activity takes place from 22.00 to 24.00 hrs.

Feeding habits. A zoophilic mosquito; biting on man is infrequent.

Flight range. Normally up to 1 km.

Susceptibility to insecticides. Resistant to DDT but susceptible to malathion and synthetic pyrethroids.
Relation to disease. Secondary vector of malaria in the plains of Odisha, Jharkhand and West Bengal.

An. varuna

Distribution. Widely in the country from North East plains, peninsular India, and Lakshadweep islands.

Breeding places. Rain water pools, tanks, ponds, rice fields, drains, irrigation channels, wells and slow moving streams with plenty of shade provided by overhanging vegetation.

Resting habits. Rests indoors during daytime in human dwellings, cattle sheds and mixed dwellings. Rests outdoors near stream banks.

Biting time. Biting goes on throughout night, but the peak biting activity is from 24.00 to 02.00 hrs.

Feeding habits. May differ from area to area.

Flight range. About 1 Km.

Susceptibility to insecticides. Susceptible to DDT and other insecticides used in control programme.

Relation to disease. Secondary vector of malaria in Andhra Pradesh, Jharkhand and Odisha.

An. sundaicus

Distribution. Reported from coastal Orissa, Andhra Pradesh and West Bengal in 1950's. At present it is restricted to Andaman and Nicobar Islands.

Breeding places. Brackish water pools with algae, margins of mangroves and lagoons and swamps. It can tolerate salinity levels of 0.08% to 2.6% and pH 7.7 to 8.5.

Resting habits. Rests indoors in human dwellings, cattle sheds and mixed dwellings.

Biting time. Biting goes on throughout the night but peak biting is from 20.00 to 02.00 hrs.

Feeding habits. An opportunistic feeder; prefers to bite man.

Flight range. About 1-3 Km.

Susceptibility to insecticides. Susceptible to DDT and other insecticides used in control programme.

Relation to disease. Now responsible for malaria transmission in Andaman and Nicobar Islands only.

Under NVBDCP entomological surveillance is being carried out in 72 entomological zones by entomological units at Regional Offices of Health and Family Welfare.

Annex 8

Entomological surveillance

Entomological surveillance in the programme is being carried out with 72 entomological zones and entomological set-up at Regional Offices with overall monitoring and supervision by the Directorate of NVBDCP in the country. The guidelines for carrying out entomological work are circulated to the zones from time to time by the Directorate of NVBDCP. The calendar of activities planned for the next year by the zones should be made in December and sent to the State with copies marked to ROH&FW and Directorate of NVBDCP.

Visits by entomological teams and frequency

All districts under the entomological zones should be visited by the zonal team at regular intervals throughout the year. A minimum of three to four days will have to be spent in each PHC.

- In entomological zones having two districts under their jurisdiction, visits should be made regularly in all the months selecting two PHCs in each district.
- In zones having three districts, the most problematic district will be visited every month and each of the other two districts will be visited in alternate months (two PHCs in each district will be visited).
- In zones having four districts, visits will have to be made in alternate months to each district: visits to 1st and 2nd districts made in January, March, May, July, September and November; and visits to 3rd and 4th districts in February, April, June, August, October and December.
- In zones having five districts, the most problematic district will have 4 PHCs and the other four districts will have two PHCs each visited every quarter.
- In zones having six districts, quarterly visits will be made in 1st and 2nd districts in January, April, July and October; 3rd and 4th districts in February, May, August and November; and 5th and 6th districts in March, June, September and December.
- In zones with more than six districts, one PHC will be selected in each district, and 4 PHCs will be visited every month, two in the first fortnight and the other two in the second fortnight.

Selection of index villages and duration of monitoring of data

The selection of PHCs as well as index villages will be based on high incidence of malaria with *Pf* predominance, vulnerability to epidemics and high vector density. Once the index villages are selected, monitoring of entomological data will have to be continued for a minimum of three years but not exceeding five years. After this, data will be collected from the other problem PHCs.

Entomological parameters

Vector density. Per man hour densities of mosquitoes will be monitored by two insect collectors by aspirator tube and flash light method by spending 2 to 3 hours in the morning hours. This should be done in all index villages.

Whole night collection. The human bait collection from 6.00 p.m. to 6.00 a.m. may be done in one of the index villages in a district. This information should be collected positively during transmission season and at least once during every quarter on indoor as well as on outdoor human baits. Animal bait collection may be done simultaneously with the human bait once during transmission season and second time during non-transmission season. Hourly collection will be separately recorded for 12 hours.

Recording of abdominal condition and dissection of mosquitoes. All the female specimens of vectors and suspected vectors will be dissected for oocysts and sporozoites after classifying the abdominal condition. The dissection of mosquitoes of whole night human bait collection is separately indicated in the proforma. A good proportion (not less than 200 females) will also be examined for parity rate during a month.

Susceptibility tests

Adult test. The susceptibility status of all vectors and suspected vectors should be determined at least once a year in all the districts. Priority should be given to those districts where no information has been collected during the preceding five years. The tests should be done with the diagnostic doses of DDT, Malathion and synthetic pyrethroids. Whenever sufficient number of mosquitoes is collected, information of LD_{50} values may also be collected by changing the time of exposure. In districts where the vector has been found to be resistant to DDT and Malathion, testing with synthetic pyrethroids may also be conducted. The impregnated papers of diagnostic doses will be supplied to entomological zones on request after procuring the same from the WHO.

Larval Test. The larval susceptibility tests are conducted once a year in every district where larvicides/biocides are in use. If the test kit is not available in any entomological zone, the kit can be shared between the neighbouring zones till such a time that a new kit is made available. The susceptibility tests shall be conducted on priority in the urban areas where organophosphorus compounds such as temephos and fenthion are being used as larvicides.

Contact bioassay

This test should be conducted during spray season at two-weekly intervals to determine the residual efficacy of the adulticide. The zones which are not in possession of the kits may indicate the same to the Directorate of NVBDCP and the kits will be supplied after procuring the same from WHO, along with other kits.

Aerial bioassay

This test is conducted to determine the fumigant efficacy of insecticides, especially of organophosphorus compounds. The tests may be conducted at two-weekly intervals following insecticidal spray.

For details on the entomology formats, refer the NVBDCP website link http://nvbdcp.gov.in/Doc/IVM10_March_2016.pdf

Annex 9

Insecticides used in malaria control

Vector control by use of insecticides is one main strategy for reducing malaria transmission. The formulations of synthetic insecticides used in malaria control programme in India include wettable powders (WP) for IRS and emulsion concentrates (EC) for larval control. The insecticides used in IRS are DDT 50% WP, Malathion 25% WP and synthetic pyrethroids which include Deltamethrin 2.5% WP, Cyfluthrin 10% WP, Lambdacyhalothrin 10% WP and alphacypermethrin 5% WP. Synthetic pyrethroids are also used for impregnation of bed nets. Temephos and *Bacillus thurungiensis var israelensis*, a biocide are the commonly used larvicides.

Mosquitoes resting indoors on sprayed surfaces after taking blood meal from an infective person, pick up insecticide particles from the walls and other indoor surfaces of the house. As a result their life span is reduced and they do not survive long enough to become infective. In areas where the vectors are strongly endophilic (i.e. they tend to rest indoors), IRS of human dwellings can give very effective control. Vectors that are exophilic (i.e. they tend to rest outdoors) but tend to feed or rest indoors briefly, can be effectively controlled by IRS with insecticides that have good vapour effect. In areas where vectors are strongly exophilic and exophagic (i.e. they rest and bite outdoors), other control methods, such as use of ITN/LLIN while sleeping outdoors should be considered.

The effectiveness of IRS for malaria control depends on adherence to the specified criteria of the insecticide and application procedure, public acceptance of spraying, availability of well-maintained equipment and adequately trained spray personnel, distribution of malaria cases, vector behaviours and insecticide susceptibility.

Several factors need to be considered in the selection of an insecticide for spraying, including availability, cost, residual effectiveness, safety, vector susceptibility and excito-repellency.

Change of insecticide

The state government should support their choice of insecticide for IRS by documentation of data on vector resistance studies and field observations on epidemiological impact of spray in respect of insecticide in use. The change of insecticide will always be decided in mutual consultation between SPO, ROH&FW and the Directorate of NVBDCP with concurrence of state and central governments. The state government should submit the proposal for change of insecticide to Directorate of NVBDCP in the month of January-February. All technical data on vector resistance, epidemiological impact of the current insecticide in use, along with financial outlay, quantity of alternative insecticide chosen, with comparative cost difference for spray operations

should be included in the proposal. The proposal should be discussed in the annual action plan meeting in Directorate of NVBDCP.

Consultations on the subject shall take place between the SPO, ROH&FW and Directorate of NVBDCP in the month of March-April and a report prepared in this regard should be submitted to the Technical Advisory Committee (TAC) under the chairpersonship of the DGHS, for approval. The approval should be obtained by April-May. The new insecticide should be procured and its delivery ensured for the insecticide to reach the periphery by March-April of the next year i.e. well before start of the first round of spray. Therefore, it is essential that all insecticide resistance data are availed to the NVBDCP / TAC in a timely manner.

Insecticides used under NVBDCP

The following insecticides are used under the NVBDCP for control of malaria.

DDT (Dichloro-diphenyl-trichloroethane)

DDT has been in use for malaria control in India since 1946. The Stockholm Convention has given an exemption for production and public health use of DDT for indoor application to VBDs, mainly due to absence of equally effective and efficient alternatives. WHO expects that there will be a continued role for DDT in malaria control until equally cost-effective alternatives are developed.[14] DDT is therefore used in India for malaria control and kala-azar elimination. The DDT mandate committee constituted by GoI reviews the use of DDT in public health and makes the decision on its quantity to be released to the NVBDCP every year.

Malathion

Malathion 25% WP is an organophosphate insecticide used in areas with DDT resistance. When perennial transmission is present, three rounds of spray with organophosphorous compounds are done as against two rounds of spray with DDT. However, because of its toxicity, workers engaged in its spray should be provided with more elaborate protective garments and their blood cholinesterase level checked periodically to assess the toxicity impact. In cases with symptoms of acute organophosphate poisoning, the patient should be immediately transported to a doctor and given the antidote, i.e. atropine 2-4 mg i.v. for adults and depending on symptoms continuing, given further doses of atropine 2 mg every 15 minutes for up to 2 to 12 hours in severe cases. Auto-injections are also available for administration of atropine.

[14] The use of DDT in malaria vector control, WHO position statement, WHO, 2011

Synthetic pyrethroids

These are newer insecticides introduced for control of VBDs in India. The cost of these insecticides is higher than the cost of DDT and Malathion. Currently the insecticides of this group registered with Central Insecticide Board for use in the programme are Deltamethrin 2.5% WP, Cyfluthrin 10% WP, Lambdacyhalothrin 10% WP, Alphacypermethrin 5% WP, and Bifenthrin 10% WP.

Formulation, dosage and requirement of insecticides for IRS

S.No	Name of insecticide	Amount of insecticide to prepare 10 litres of suspension	Dosage per sq. m of active ingredient	Residual effect in weeks	Area (in sq. m) to be covered by 10 litres of suspension	Requirement of insecticide per million population (in MT)
1.	DDT 50% WP	1.000 Kg	1 gm.	10 -12	500	150.00
2.	Malathion 25 % WP	2.000 Kg	2 gm.	6 - 8	500	900.00
3.	Deltamethrin 2.5% WP	0.400 Kg	20 mg.	10 -12	500	60.00
4.	Cyfluthrin 10% WP	0.125 Kg	25 mg.	10 -12	500	18.75
5.	Lambdacyhalothrin 10% WP	0.125 Kg	25 mg.	10 -12	500	18.75
6.	Alphacypermethrin 5% WP	0.250 Kg	25 mg.	10 -12	500	37.50
7.	Bifenthrin 10% WP	0.125 Kg	25 mg.	10-12	500	18.75

Note: In the case of Malathion, the requirement shown above, is for the three rounds

Formulation, dosage and requirement of insecticides for indoor space spray

S. No	Name of insecticide	Commercial formulation	Preparation	Equipment
1	Pyrethrum extract	2.0%	1 part of pyrethrum extract in 19 parts of kerosene oil (50 ml in 1 litre)	Pressurised spray machine or fogging machine
2	Cyphenothrin	5% EC	0.5 mg a.i. per sq.m (20 ml in 1 litre Kerosene oil)	

In treating synthetic pyrethroid poisoning, vitamin E oil preparations are given for prolonged paraesthesia. Only in cases of definite allergic symptoms should corticosteroids be administered. On occurrence of convulsions after severe intoxication, intravenous injection of 5-10 mg Diazepam (or any other benzodiazepine derivatives) should be given.

Formulation, dosage and requirement of larvicides

S. No	Name of larvicide	Commercial formulation	Preparation of spray solution	Dosage per			Frequency of application	Equipment used	Application
				per sq. m	50 linear metre	Hec tare			
1	MLO	100% Petro-leum product	As it is	20 cc	1 L	200 L	Week ly	Knapsack/ compressi on sprayer	Applied along the shore of water body
2	Temeph os (Abate)	50% EC	2.5 cc in 10 L potable water	20 cc	1 L	200 L	Week ly	Knapsack/ compressi on sprayer	Can be applied in clean water
3	Bacillus thuringie nsis var israelens is	Wettable Powder	5 Kg in 10 L	-	-	5 Kg	Fort-nightl y	Knapsack/ compressi on sprayer	For both clean and polluted water
4	Bacillus thuringie nsisvar israelens is 12 AS	Aqueous suspen-sion 12 AS	1 L in 10 L	-	-	1 L	Week ly	Knapsack/ compressi on sprayer	Clean Water
			2 L in 10 L	-	-	2 L	Week ly	Knapsack/ compressi on sprayer	Polluted Water
5	Diflu-benzuro n 25% WP	25% wettable powder	100 g in 100 L	-	-	25 g a.i	Week ly	Knapsack/ compressi on sprayer	Clean water
			200 g in 100 L			50 g a.i			Polluted water
6	Pyriprox yfen	0.5 % granular	Ready to use	-	-	2 Kg	3 weekl y	Granular applicator/ hand broadcast	Clean water
						4 kg			Polluted water

General safety precautions

Exposure to insecticides may occur during package opening, mixing and preparation of the spray and during the spraying. The following precautions should be observed:

- Wear a protective hat and face-shield or goggles, during the spray process
- Do not eat, drink or smoke while working
- Wash hands and face with soap and water after spraying and before eating, smoking or drinking
- Shower or bath at the end of every day's work and wear new clean clothes
- Wash overalls and other protective clothing at the end of every working day in soap and water and keep them separate from the rest of the family's clothes
- If the insecticide touches the skin, wash off immediately with soap and water
- Change clothes immediately if they become contaminated with insecticides
- Inform the supervisor immediately if one feels unwell

Protective clothing and equipment

As absorption of insecticide occurs mainly through the skin, lungs and mouth, protective clothing and equipment given below must be worn in accordance with the safety instructions on the product label:

- Broad-brimmed hat (protects head, face and neck from spray droplets)
- Face-shield or goggles (protects face and eyes against spray fall-out)
- Face mask (protects nose and mouth from airborne particles)
- Long-sleeved overalls, worn outside of boots
- Rubber gloves
- Boots

Disposal of remains of insecticides and empty packaging

At the end of the day's work, the inside of the sprayer should be washed and any residual insecticide flushed from the lance and nozzle. The rinsing water should be collected and carefully contained in clearly marked drums with a tightly fitting lid. This should be used to dilute the next day's tank loads or disposed properly by the supervisor.

The remaining insecticide should never be poured into rivers, pools or drinking-water sources. Decontaminate glass, plastic or metal containers by triple rinsing, i.e. part-filling the empty container with water three times and emptying into a bucket or sprayer for the next application. All empty packaging should be returned to the supervisor for safe disposal according to national guidelines. Empty insecticide containers should never be re-used.

Storage and transport

Pesticide storehouses must be located away from areas where people or animals stay and water sources, wells, and canals. They should be located on high ground and fenced, with access only for authorized persons. However, there should be easy access for pesticide delivery vehicles and, ideally access on at least three sides of the building for fire-fighting vehicles and equipment in case of emergency. Pesticides must not be kept where they would be exposed to sunlight, water, or moisture which could affect their stability.

Storehouses should be secure and well ventilated. Stocks should be arranged so that the oldest are used first ("first in first out" or, better, "first expiring first out" principle) to avoid the accumulation of obsolete stock. Containers should be arranged in a way to minimize handling and thus avoid mechanical damage which could give rise to leaks. Containers and cartons should be stacked safely, with the height of stacks limited to ensure stability.

Pesticides should not be transported in the same vehicle as agricultural produce, food, clothing, drugs, toys, and cosmetics etc. that could become hazardous if contaminated. Pesticide containers should be loaded in such a way that they will not be damaged during transport, their labels will not be rubbed off and, they will not fall off the vehicle onto the roads. Vehicles transporting pesticides should carry prominently displayed warning notices. Pesticides should not be carried in the passenger compartments of transport vehicles and should be kept tightly secured and covered at all times during transport. The pesticide load should be checked at intervals during transportation, and any leaks, spills, or other contamination should be cleaned up immediately using accepted standard procedures. In the event of leakage while the transport vehicle is moving, the vehicle should be brought to a halt immediately so that the leak can be stopped and the leaked product cleaned up. Containers should be inspected upon arrival at the receiving station. There should be official reports to the national level and follow-up enquiries in the event of fires, spills, poisonings, and other hazardous events.

Distribution of pesticides should be carried out by trained personnel under proper supervision. Mishandling can result in the product falling into hands of uninformed recipients and causing human or environmental risk. Proper packaging is also important to ensure confinement of the product and its safe handling. The original package is intended to ensure safe distribution; when repacking is necessary, the new packing should meet the specifications of the original packaging.

Annex 10

Technique for IRS

Manpower Requirement

It is estimated that 52 spray squads are required for 5 months to cover houses of one million population with 2 rounds of DDT / synthetic pyrethroids spray; and 87 squads are required for 4½ months for 3 rounds of Malathion spraying. Each spray squad consists of 5 field workers working with two stirrup pumps and one Superior Field Worker (SFW). It is expected that a spray squad can, on an average, cover 60 to 80 houses per day. One squad will take 12 to 17 days to cover a subcentre area with an average population of 5,000.

Equipment

Each squad requires the following equipment which must be kept ready before spray rounds start:

- Stirrup pumps - 2
- Spray nozzle tips for spray pumps - 2
- Bucket 15 litres - 1
- Bucket 5 litres - 1
- Bucket 10 litres - 1
- Asbestos thread - 3 metres
- Measuring mug - 1
- Straining cloth - 1 metre
- Pump washers - 2
- Plastic sheet (3x3 metres) - 1

The squad supervisor must have extra spray pumps, nozzle tips, washers, asbestos threads and a set of tools for minor repairs which should include a pipe wrench, pliers, screwdrivers and spanners. A good quality nozzle should be used. Each squad must also be provided with personal protection gear including masks and soap to wash.

Preparation of insecticide suspension

The required quantity of insecticide should be issued to the squads each day by the supervisor after checking balance stocks available from previous day's supplies. The preparation of the spray suspension is made just before the start of the spray operations every day. It is important that the suspension is made correctly so that the correct dosage is applied on the sprayed surfaces.

The procedure for the preparation of the suspension is the same irrespective of the insecticide. However, the quantity of the insecticide used per 10 litres of water will depend on the insecticide used. The required quantity of the insecticide is measured with a plastic mug and poured into a 15 litre bucket. A paste is made with a small quantity of water. The remainder of water is then poured slowly into the bucket and the insecticide water mixture stirred vigorously to obtain a uniform suspension. The suspension is then poured into another bucket through a cloth sieve to remove any particulate matter that might clog the nozzle of the spray pump. The insecticide suspension should be stirred vigorously at least every hour.

Spraying

All food, cooking utensils, bedding and clothes must be protected from the insecticide by taking them outside the house before spraying starts.

The barrel of the stirrup pump is put in the bucket containing the spray suspension. One man operates the pump and the other man sprays. The spray lance should be kept 45 cm (18 inches) away from the wall surface. The swaths should be parallel. Spray is applied in vertical swaths 53 cm (21 inches) wide. Successive swaths should overlap by 7.5 cm (3 inches). Spray is done from roof to floor, using downward motion, to complete one swath; then stepping sideways and spraying upwards from floor to roof. The spray should not drip to the floor. Spraying is done only on inner surfaces, including eaves and roofs. It takes about 5 minutes to spray a house with an average surface area of 150 sq. metres.

The discharge rate should be 740 to 850 ml per minute. To obtain the above discharge rate, 20 to 26 strokes should be given per minute with 10-15 cm plunger movement at a pressure of 10 PSI (0.7 kg/sq.cm) at the nozzle tip. Spraying into a bucket for one minute and measuring the quantity of the suspension in a graduated mug will check the correct discharge rate (740 to 850ml / minute). The nozzle tip should be discarded if the discharge rate exceeds 850 ml per minute. If the spray stops due to a blockage in the nozzle, the nozzle cap should be unscrewed to remove the blockage and replaced with a new one. The blocked nozzle should be put in a container with water for a few hours before the blockage is removed with a fine wire.

A good quality spray should lead to uniform deposits on walls and other sprayed surfaces. This is easy to verify for DDT and Malathion sprays as the insecticide deposits are clearly visible. Deposits of synthetic pyrethroids are visible on wooden structures. The supervisor through physical verification should verify the quality and coverage of spray randomly. A summary of spray operations in each village should be maintained by the SFW and verified by the health worker showing the areas covered and room coverage (VC-1).

Annex 11

Procedure for insecticide impregnation of bed nets

Step 1: Collect the equipment

The equipment for impregnation of bed nets consists of mosquito nets, insecticide, basin, measuring container, rubber gloves and soap. The net should be washed/cleaned before treatment. The nets should preferably be treated outdoors in the shade. If treatment is to be carried out indoors, a room with open windows should be used. Use basin and gloves that are not used for any other purpose.

Step 2: Put on protective gloves before treating nets

Step 3: Measure the correct amount of water

The amount of water needed depends on the net material. Regardless of the size and shape of net, the amount of water required for one synthetic net (nylon, polyester) is ½ litre (if the net is very large, more water may be needed). If a measuring container comes with insecticide, use it to measure water. Otherwise, use any measuring container that is not used for food, drinks or medicines.

Step 4: Measure the correct amount of insecticide

The amount of insecticide or “dose” needed to treat a net depends on the type of insecticide used. Follow instructions on the container / sachet / packet. Generally, 10-15 ml of insecticide is required to treat one single net. The leftover insecticide should be stored in its original container, in the dark and away from children.

Step 5: Mix the water and insecticide thoroughly by gloved hands in basin

Step 6: Treatment of nets

- Always impregnate one bed net at a time
- Put the net in the basin containing water and insecticide
- Soak the net long enough to ensure that all parts of the nets are impregnated
- Take out the net and allow excess liquid to drip back by squeezing it gently, but do not wring it.

Step 7: Drying the nets

- Let the net dry flat in the shade on plastic sheets
- Later, the net can be hung up to complete the drying in the shade

Step 8: Disposal of leftover mixture of water and insecticide, and insecticide containers

- Following the treatment of all available nets, the leftover mixture of water and insecticide, if any, may be used to treat curtains.
- Otherwise, dispose the liquid in the toilet or a pit away from habitation, animal shelters, drinking water sources, ponds, rivers and streams.
- Destroy empty insecticide containers, sachets and packets and/or bury in a pit away from habitation, animal shelters, drinking water sources, ponds, rivers and streams.

Step 9: Washing and cleaning of hands and equipment

- Wash the equipment (basin, measuring container) with lots of water while wearing protective gloves
- Wash gloves (if non-disposable ones are used) with soap and lots of water, or dispose with insecticide containers
- Wash hands with soap and lots of water

Step 10: Washing and re-treatment of nets

- Washing removes the insecticide from the net. So, wash the nets as seldom as possible and gently with soap and cold water and dry flat on plastic sheet in shade.
- Do not wash/rinse treated net in or near drinking water sources, ponds, lakes, rivers, streams.
- Dispose of water for washing/rinsing in the toilet or in a pit away from habitation, animal shelters, drinking water sources, ponds, rivers and streams.
- Nets must be re-treated again after it has been washed three times; or, at least once a year even if it is not washed, preferably just before the rainy season. Nets may be treated twice a year in areas that have plenty of mosquitoes throughout the year.

The following points should be remembered:

- Use the insecticide-treated net every night, all year round, even if mosquitoes are not seen / their buzzing sound is not heard.
- Everyone should preferably sleep under a treated mosquito net, and pregnant women and children under five years must definitely sleep under the treated net.
- Insecticides used for mosquito nets are not harmful to people, if used correctly.
- Direct skin contact with the insecticide on a still wet treated net may cause a tingling sensation on the skin. This is not harmful, even for small children.
- After treatment, the net may smell of insecticide. This will go away in a few days and is not harmful to people who sleep under the net.

Annex 12

Logistics of LLINs

Those responsible for LLIN logistics must ensure adequate storage capacity for them and reliable transport at all levels to ensure timely delivery. The planning must include a detailed budget for all transport and storage needs. Adequate supervision and control of all operations and full accountability must be ensured at every stage. It should be ensured that LLINs are not sold off at any stage as their diversion may have adverse impact on the programme at all levels.

Storage

LLIN bales are well and securely packed and individually wrapped in sealed plastic bags. Nevertheless, it is important to ensure that warehouses are clean and dry. The shelf-life of LLIN should be ascertained from the manufacturer. The bales are relatively easy to handle, being light enough to be moved manually. The principal concern in their storage is one of volume rather than weight. The very large volumes involved make it critical that there is adequate storage capacity at all levels. The tightly packed and tied bales can be stacked several layers high (up to a height of 5 m) without any damage to the bottom layers. In theory, 5.8 bales of polyester LLINs occupy a volume of 1 m^3; in practice, 4 bales / m^3 is a reasonable working figure. Thus, if a warehouse space is 10 m x 20 m with storage height of 3 m, available volume is 600 m^3, which would accommodate 600 x 4 = 2,400 bales or a total of 240,000 polyester LLINs. Monofilament polyethylene LLINs can be stored at 6 bales / m^3, so that the same warehouse volume of 600 m^3 would accommodate 3,600 bales or 144,000 LLINs of this type. Storage space can often be rented, but rental costs would then have to be weighed against the possibly greater cost of staggered delivery. Stock management is relatively simple because LLINs are well packed and do not deteriorate physically. Stock management should be based on the “first in, first out” rule, making a methodical approach particularly important when containers are off-loaded in a large warehouse. Bales must be stacked in the same way throughout the operation, to create equal piles each identified by bin card. Bales must be carefully counted by at least two individuals during off-loading of the containers providing double-check of the quantities indicated on the bills of lading.

Transportation

Although LLINs are usually individually wrapped and bales robustly packaged, every transport vehicle must be equipped with minimum of a tarpaulin for the protection of its loads. As for storage, the principal consideration in the transport of LLINs is one of volume rather than weight. Travelling on good roads, a typical 25-ton semi-trailer truck can carry the equivalent of the contents of a 40-foot container; correctly loaded, an 8-ton truck can carry 140 bales. Onward transport of LLINs from district level storage to health facilities could be done, if needed, by the vehicles normally used to carry medicines, vaccines and

other supplies; and within the district, often by motorcycles and for shorter distances, by bicycles. The weight of one LLIN is approximately 650 g. Initial experiences in some countries indicate that it is possible to transport 4-6 LLINs on a bicycle and 10 on a motorcycle, in addition to a vaccine carrier. One 4 x 4 vehicle with mobile team members and vaccines and equipment can carry 150 LLINs weighing 97.5 kg.

The states and UTs should develop and follow state specific LLIN distribution plan in line with national guidelines.

Annex 13

Epidemic control

Proforma - 1: List of villages within the malaria epidemic zone

PHC ……. Subcentre …….

S. No.	Name of village	Population	Number of households	Number of fever cases
Total				

Proforma – 2: Daily report on malaria outbreak to be sent to PHC/DVBDCO

Reporting unit …… Date of report ……

1. Affected villages & control measures

Affected villages	Population at risk	Covered under FRT	Total houses	Houses sprayed	Other control methods

2. Cases and deaths

	New	Cumulative
Number of fever/clinical cases	…….	……..
Number of positive cases	…….	……..
Number of treatment failure cases*	…….	……..
Number of P. falciparum cases	…….	……..
Total number of deaths due to malaria	…….	……..
a) Parasitological confirmed ……..	…….	
b) Suspected malaria ……..	…….	
Number of severe cases	…….	……..
Number of malaria cases referred to hospital	…….	……..
Number of deaths among cases referred	…….	……..

Note. The above information should be made available for each affected village
* Treatment failure case: A patient who has taken full dose of antimalarials according to the national drug policy, has retained it and is not responding till 4th day of treatment.

3. Logistics

Drugs	Received	In stock	Additional requirement
Chloroquine Tab (150mg base)			
ACT			
Primaquine (2.5 and 7.5mg tabs)			
Others			

4. Supplies and Equipment

Name of commodity	Received	In stock	Additional requirement
RDT kits			

This report should be compiled on weekly basis at PHC. The outbreak trend and additional inputs required is to be assessed at the district level.

Proforma - 3: Epidemiological investigation report of malaria outbreak

Baseline Information

Total population of affected district …….

	PHC	Villages/areas
Total number	…….	……..
Number affected	…….	……..

Total population of affected areas (population at risk) ……..
Number of houses in affected areas ……

Month-wise data on malaria during past five years

Date of receipt of information by the district ……..
Date(s) of investigation by DVBDCO ……..

Parasitological survey (fever survey and/or mass survey)

- Number of blood slides examined ……..
- Number of positive blood slides ……..
- Number of *P. falciparum* cases ……..
- Number of deaths due to malaria ……..
  (a) Confirmed parasitologically ……
  (b) Suspected ……..

Entomological survey (describe responsible vector(s), suspected or confirmed)

……
……
……

Genesis of outbreak

……
……
……

Control measures

DDC / FTD established ……..
Details of FRT and mass drug administration ……
……
Number of field laboratories established ……
No of referral hospitals identified …….

Transmission control measures carried out with target and coverage (IRS, fogging, specify any other measures)

……
……
……
IEC activities carried out ……...

Proforma - 4: Final report on malaria outbreak and its control

Reporting district ……. State ……

1. Baseline Information

Total population of affected district …….

	PHC	Villages/areas
Total number	…….	……..
Number affected	…….	……..

Total population of affected areas (population at risk) ……..

Number of houses in affected areas ……

Staff position

Category	Sanctioned	In position

2. Cases and deaths (date from …… to ……..)

Number of clinical malaria cases ……
Number of laboratory confirmed cases ……
Number of malaria treatment failure cases ……
Number of *P. falciparum* cases ……
Total number of deaths due to malaria ……
(c) Confirmed parasitologically ……
(d) Suspected ……
Number of severe malaria cases referred ……
Number of deaths among cases referred……

3. Investigations

Date of outbreak notification received by district …….
Date(s) of investigation by DVBDCO ……..

Results of investigation

……
……
……
……
……

Parasitological survey (Fever survey and / or mass survey)
Number of blood slides examined ……..
Number of positive blood slides ……..
Number of *P. falciparum* cases ……..
Number of deaths due to malaria ……..

Entomological survey (describe responsible vector(s), suspected or confirmed)

……
……
……
……
……

Genesis of outbreak

……
……
……

Control Measures

DDC / FTD established …….

Details of FRT and mass drug administration

……

No of referral hospitals identified …….

Transmission control measures carried out (IRS, fogging, specify any other measures)

……
……
……

Logistics and supplies

During past three years

……
……

During current outbreak

……
……

Final report: After two follow-up surveys are over, a final report is to be prepared, bringing out the details of epidemiological investigation conducted, control strategy adopted and lessons learnt. The final report should be circulated to other States and other districts within the state to help them be better prepared to prevent outbreaks and act promptly in impending outbreaks.

Proforma - 5: Investigation report of deaths due to malaria

Investigation to be done by DVBDCO / AVBDCO / District VBD consultant in consultation with a Medical Officer

Date of Investigation: ……

1. Basic information:

Name of the deceased ……Age (in years) …… Sex …….
In adult female, indicate status of pregnancy and its complications, if any:
Date of onset of illness…… Date of death ……
Date of first contact with health care provider (ASHA/MPHW/SC/PHC/CHC/District hospital/ others (specify) ……..
Occupation of the deceased: …….
Complete address (usual place of residence)
……
……
Place where disease started: ……
History of movements (within 3 weeks preceding from the date of onset of illness)
……
Source of information: Relatives/Paramedical staff/ Treating physician/ Specialist/other (specify)

2. Major signs and symptoms with duration

Signs/symptoms	Duration	Signs/symptoms	Duration
Fever		Jaundice	
Bleeding		Dyspnoea	
Neck rigidity		Convulsions	
Anaemia		Rash	
Diarrhoea		Oliguria/anuria	
Altered sensorium		Coma	

Other signs/ symptoms: …….
H/O of chronic illnesses (Diabetes, hypertension, asthma, HIV etc.) ……
Any relevant history in the past: ……..
H/O of similar illness in family/neighbourhood in the past: …….

3. Parasitological Investigation

RDT: Date of test: ……Place of test …… Result: *P. falciparum / P. vivax*

Microscopy: Date of slide collection: …… Place of test: ……
Date of receipt of result: …….Result: *P. falciparum / P. vivax* / others (specify)

4. Other biochemical/pathological investigations done and results (specify):

5. Diagnosis

Clinical diagnosis: …….
Confirmed diagnosis: Malaria (*P. falciparum/P. vivax*/ others (specify) …….

6. Treatment before hospitalization

Name of drug	Dosage	Date		Route of administration
		From	To	

7. Treatment after admission to hospital

Name of drug	Dosage	Date		Route of administration
		From	To	

Other supporting treatment: ……..

8. Cause of death: Parasitologically confirmed malaria (*P. falciparum/P. vivax*/others (specify)/clinically suspected malaria

Post-mortem diagnosis (if undertaken) ……

9. Preventive and control actions taken by State/District/local health authorities in affected area:

10. Remarks of the investigating officers:

Name and signature of DVBDCO/ Assistant DVBDCO/VBD consultant

Name and signature of medical officer

Mass survey

Manpower requirements

Blood smear collection and administration of treatment

A two member team is expected to collect 100 blood smears and administer treatment in a day. The number of persons required for smear collection and administering treatment are:

$$\frac{\text{Total population X 2}}{100 \text{ X } 7}$$

If the mass survey cannot be completed in 7 days, it can be extended by another 3 days. Any further delay will result in extension of the epidemic zone and deaths.

Microscopists

Though in routine duty, a microscopist is expected to examine only a maximum of 30-40 slides per day (refer annex 8), during outbreaks, one can expect a microscopist to examine about 50 slides in a day. This is because he will not be distracted with any other work and also detection is expected to be faster in a high SPR scenario. Therefore, the number of microscopists required in a mass survey are:

$$\frac{\text{Total population}}{50\text{X}7}$$

As RDTs are now being used in mass surveys instead of blood smear examination for diagnosis of malaria, the requirement of microscopists is reduced.

Drug and other supply requirements

Based on past experience, it is assumed that maximum 40% of the population in an area will be affected in any epidemic. The estimation of requirement of drugs is based on the assumption that the outbreak will affect all ages of the population. Therefore, the ACT-SP requirement for a *P. falciparum* outbreak affecting an average village population of 1,000 is given in table below, based on the population demographics.[15]
For outbreaks in NE States, the ACT-AL requirement may be estimated as follows.

[15] Census 2011, Registrar General of India, Government of India

In case of outbreaks due to P. vivax, similar calculations may be made for requirement s chloroquine tablets and primaquine (2.5 mg) tablets.

Injection Arteether - Total population x 0.6 (adults) x 0.4 (affected) x 0.1 (10% may develop severe malaria) x 3 (No of ampoules per case)
Injection Quinine – Total population x 0.4 (children) x 0.4 (affected) x 0.1 (10% may develop severe malaria) x 10 (No of ampoules per case) – for use in children and pregnant women.
No. of microscopy slides / RDTs – Total population x 0.4 (affected) x 1 (Number of RDKs would be 40% of number of slides)
No. of microscopes – One per microscopist
JSB stain, cotton-wool, alcohol/savlon, slide boxes, Lancets, material for cleaning and packing of slides, stationary, etc. to be procured on ad-hoc basis.
Accordingly other supportive materials like IV set, IV fluids, etc. to be provisioned

IRS

Manpower and equipment requirement for 10 days

Basis of calculation

Number of houses sprayed per pump per day is 30
Number of houses sprayed per squad per day is 60 (2 stirrup pumps per squad)
Number of houses sprayed per squad in 10 days is 600

The number of spray squads required to cover the villages in plain areas:

$$\frac{\text{Number of human dwellings and mixed dwellings in targeted villages}}{600}$$

In hilly areas, the number of houses sprayed per pump per day is reduced to 25 and accordingly one spray squad can spray only 500 houses in 10 days.

Therefore, the number of spray squads required to cover the villages in hilly areas is:

$$\frac{\text{Number of human dwellings and mixed dwellings in the targeted villages}}{500}$$

The composition and requirements per squad are as follows:

- Superior field workers - 1
- Field workers - 5
- Stirrup pumps - 2 (with 1 additional pump per 2 squads as reserve)
- Bucket, 3 gallon capacity - 4
- Bucket, 2 gallon capacity - 1

- Soap, straining cloth, nozzle tips, measuring jug, rope, pump repair kit, asbestos thread, washers and plastic sheets

Insecticide requirements are calculated based on the total population in epidemic affected areas

- DDT 50% wp @ 75 MT per million population
- Malathion 25% wp @ 300 MT per million population
- Deltamethrin 2.5% wp @ 30 MT per million population
- Cyfluthrin 10% wp @ 9.38 MT per million population
- Lambdacyhalothrin 10% wp @ 9.38 MT per million population

The spray operations are planned village-wise and a 10-days spray programme is made covering all villages in the epidemic zone. The MPHW/superior field worker of the mobile epidemic team will supervise spray operations and maintain a diary with record of daily spray coverage achieved of human dwellings, mixed dwellings and rooms in the villages sprayed. On completion of spray operations, the completion report is prepared for IRS and spray sprays done and sent to appropriate authorities. The MO-PHC along with MTS will supervise these operations during their entire course.

Annex 14

Anti-Malaria Month

During monsoon and post-monsoon months, the risk of malaria increases manifold on account of increased breeding of mosquitoes which spread malaria and other VBDs. Since 1977, the month of June is observed as antimalaria month (AMM), before the onset of monsoon, i.e. prior to the transmission season.

Goal

Integrated and accelerated action through communication for behavioural impact and delivery of services for informed decision-making, initiation of individual and social change towards reducing mortality and morbidity due to VBDs.

The AMM campaign is also an endeavour to augment and ensure appropriate public health focus; peoples' orientation and ownership of public health programmes; community-based approaches; public-private partnership; involvement of local bodies and Panchayati Raj Institutions; and gender equity, towards improved access to primary health care, prevention and control of communicable disease including VBDs, reduction of infant mortality rate and maternal mortality ratio and promotion of healthy life styles.

Objectives

The specific objectives of the AMM are to:

- Enhance awareness regarding source and transmission risk reduction, treatment and availability of services at different levels;
- Build support for the programme across partner organizations in other sectors, influential sectors of society (corporate houses, political representatives, social activists, media, civil society organizations, etc.) and health care service providers and elicit commitment for action; and
- Ensure availability of services.

Strategy

Social mobilization

It is a planned process of bringing together all intersectoral partners, health care service providers and the community to determine felt needs and raise awareness and demand for a social development objective. If a disease treatment or health is the felt need of the society, social mobilization puts pressure on the health system to provide necessary services. Alternatively, if community is unable to recognize a disease as a threat, social mobilization strategy is directed to create a demand for the services and to convince people to accept it. Social mobilization is achieved through advocacy workshops, intersectoral coordination and programme communication.

Advocacy workshops

Advocacy workshops aim to develop an enabling environment by education of the political leaders, elected representatives, planners, organized sectors, professional bodies and media for building support, elicit commitment and motivate them to be advocates for social development objectives, for example, prevention and control of malaria and other VBDs. The priorities are defined, appropriate policies are framed, sufficient resources are allocated and directions are provided to the implementers, thereby facilitating availability and accessibility of resources to the community. Workshops are to be planned at states, districts, municipal corporations, municipal councils, town areas, blocks, subcentres and villages during May/June for involving various stakeholders like:

- Community volunteers and peripheral health workers
- Local self-government (PRIs, village councils, tribal councils)
- Urban local bodies (Municipal Corporations and Councils, notified area committees)
- Civil society organizations (NGOs, FBOs, women's SHGs)
- Corporate sector, tea associations / estates, chambers of commerce, Confederation of Indian Industry
- Government departments
- Armed forces and Paramilitary forces
- Elected representatives
- Bureaucrats
- Media
- Medical colleges, medical associations
- Educational Institutions (students and teachers)

The advocacy workshops should be interactive in nature supported by live demonstrations for sharing knowledge, concern, experiences and identifying areas of cooperation, mobilization of available resources and implementation of effective measures for prevention and control of malaria and other VBDs. At village level, one exhibition-cum-information centre would be organized at weekly bazaars / haats. The centres would undertake public announcements / folk performances on control of malaria and other VBDs, demonstration of mosquito larvae, larvivorous fish, insecticide treatment of bed nets, and source reduction through minor engineering methods and home based morbidity management of lymphoedema. Facilities for detection of fever cases should also be made available during such event.

Intersectoral collaboration

- National task force meeting and identifying a nodal activist/champion in member organizations for monthly coordination
- State task force meetings and identifying a nodal activist/champion in member organizations for monthly coordination
- District coordination committee / block coordination committee / urban area coordination Committee / village health committee meetings and identifying nodal activists / champions in member organizations for monthly coordination.

Programme communication

Programme communication is done utilizing different media (mass media, IPC) which takes care of strengthening knowledge, beliefs, values, attitudes and confidence, strengthening enabling environment, reinforcement of knowledge, action through family, peers, teachers, employers, health service providers and community leaders. This could be done through publicity through different types of communication:

- IPC (Focus group discussion, counselling, song and drama, skits, nukkad nataks, religious sermons)
- Mass media: Electronic/multimedia (TV, radio programmes, local cable; documentaries, music videos, soap operas with in-programme messaging)
- Print (newspapers, banners, pamphlets, stickers, bus/railway tickets, postcards, envelopes, etc.)
- Other media (wall paintings, hoardings, glow signs, panels, public announcements, mobile vans, health exhibitions, etc.)

In addition, following activities are to be undertaken:

- Reorientation of Block Extension Educators/Health Educators/Nehru Yuva Kendra, National Social Services, NRC volunteers
- Reorientation of private medical practitioners in states/districts through Indian Medical Association.

IPC

IPC works best when there is one-on-one contact between the health worker and/or health educator and the person whose behaviour is sought to be changed to adopt new knowledge, life skills and practices to ensure the welfare of their families and children. One-on-one contact facilitates comprehension of new concepts and demonstration of new practices. Over a period of time, if done consistently, this method can result in adoption of new practices on a sustainable basis. The tool kit for IPC includes aids that enable the communicator/health worker to easily demonstrate any concept through visual aids like manuals, demonstration devices such as role plays, toys, flash cards, flip books etc. that depict the desired practices, interactive games and puzzles that familiarize users with the desired practices.

IPC materials

- *Flip Books, flash cards:* To be used by volunteers and health workers to counsel audiences during home visits.
- *Stickers:* For distribution among school children, shops, and other places to remind people about the core themes on prevention and control of VBDs.
- *Badge, signboards with log*: For identification of those associated with the campaign, such as ASHAs and CHVs.
- *Bag with logo*: For volunteers to carry an IPC material during door to door visits.
- Calendars: To promote the antimalaria messages among influencers, panchayat members, etc. with the key periods highlighted.

- *Mailers, gate folders and wall charts/logo stickers*: For civil society organizations, doctors, chemists, ASHAs, CHVs.
- *Illustrated booklets* (predominantly visual) with stories on prevention and control of malaria and other VBDs especially for children.

Mass media

- *TV and radio***.** Spots, jingles, skits, interactive programmes, phone-in programmes, quiz programmes through Doordarshan / regional channels / private channels, All India Radio / Vividh Bharti / FM radio / regional channels etc.
- *Print*. Newspapers, pamphlets, leaflets, stickers, booklets, posters, flip books, flash cards, tickets, OPD registration forms, official stationery, calendars, mailers, gate folders and wall hangings
- *Multi-media.* Documentaries, music videos/bands, soap operas
- *Outdoor publicity.* Hoardings, glow signs, bus panels
- *Other media.* Local cable, mobile vans etc.

Ground communication

Folk performances are important on account of reach, credibility, persuasiveness and ability to adopt performances to the message as well as costs. The focus and venue of the show are to be selected with care, keeping in mind the socio-cultural environment of the area and target audience.

Melas and haats/bazaars are prominent features of rural life. While haats/bazaars refer to periodic markets held for trading, melas are usually more for either religious or exhibition purpose. Both of these offer large audiences in a short span of time, who are open and more receptive to information as they are in leisure mode.

ASHA and AMM

During AMM, ASHAs are expected to create awareness on health and its social determinants such as basic sanitation and hygienic practices, healthy living, appropriate water storage practices, existing health services and the need for timely utilization of health services (like re-impregnation of ITN) in addition to her regular activities of providing a minimum package of curative care and arranging timely referrals.

Source reduction of mosquito breeding through BCC campaigns

During AMM, the ASHA would organize BCC campaign, providing information to the community through IPC, distribution of IEC materials as well as other BCC activities i.e. group communication pertaining to prevention and control of malaria like how to eliminate breeding sites:

- Filling of pools, ponds, borrow-pits and hoof-prints in and around the village.
- Removal of discarded containers that might collect water
- Covering water tanks with properly fitted lids

- Clearing vegetation and other matters from the bank of the streams as this will speed up the flow of water and eliminate pools where mosquito prefers to breed
- Repairing leaking tap and removing spillage of water around hand pumps and wells or peer drains

Augmentation of vector control measures

During AMM campaign ASHA is expected to communicate the following messages:

- Spraying on walls kills mosquitoes or helps to drive away the mosquitoes and thus reduce the risk of malaria
- Outside walls or places like the cattle shed are not to be sprayed because this would actually drive the mosquitoes into the house and thereby cause more harm
- Mud plastering after spray operations should not be done as it will lower the effect of insecticides on mosquitoes.

Larvivorous fish

During AMM, ASHA should advise the community to introduce larvivorous fish in water bodies. She should contact the health workers to get the larvivorous fish from the nearly hatchery.

ITN/LLIN

ASHA should promote the use of bed nets by explaining the importance of using ITNs/LLINs and that ITNs/LLINs are not to be washed frequently and are required to be re-treated in a timely manner. She should organize camps for treatment of ITNs and community owned bed nets at village level. She should also teach the community members about how to properly care for the nets and about repair of torn nets by stitching, patching, tying knots etc.

Phasing of AMM campaign

Since 2005 it has been envisaged that AMM campaign would not be confined to that specific month of June alone like earlier, but would be implemented in phases throughout the year. During the months of June to August, intensive activities would be undertaken through three modes, viz., umbrella campaign, localized campaign and on-ground initiatives as well as concurrent and consecutive evaluations would be completed. Localized follow up campaign as well as on ground initiatives should be continued in the months of September, October and November. The months of December to February would be the preparatory phase for the next year's AMM Campaign.

During this phase, AMM report of the previous year would be compiled, action plans would be drawn and BCC materials would be finalized and distributed to different levels of implementation. In the months of March to May, advocacy workshops, Task Force/Coordination Committee/ Health Committee meetings will be held apart from finalization of BCC materials and printing for distribution to states/districts/intersectoral partners.

Funds

There is no separate budget allocation for AMM since it is an integral part of BCC component of the programme. Expenditure towards the AMM campaign should be met out of the funds released for BCC/IEC.

Monitoring and evaluation

Evaluation of the activities by observers at each level of implementation will be an inherent component of the AMM campaign for:

- Demonstrating that particular intervention/medium reached and served its purpose;
- Obtaining guidance for programme decisions and policy review; and
- Determining whether improvements in health outcomes are causally linked to a given intervention or a given behavioural change.

The monitoring checklist and format are given in the following pages. The DVBDCO should compile the report for PHCs and send it to the State Headquarter every month for onward submission to the Directorate of NVBDCP.

Checklist for monitoring AMM campaign at central/state/district levels

1. Site of visit (name): State / District / Block / Municipal area / Municipal council town / Subcentre / Village ……..

2. Date of visit: ……

3. Name and designation of the person(s) interviewed: ……

4. Name of programme officer/coordinator (State/District/Block/Municipal Area/Municipal Council/Town/Subcentre/Village …….

5. Is there a calendar of activities for AMM as per the guidelines? Yes/No

6. Date and number of advocacy workshops held (please attach list of participants, if available; agenda; recommendations and complimentary activities undertaken)
……

7. Is there a State task force, District/Block/Urban Area/Coordination Committee, and Village Health Committee? Number of meetings held prior to AMM? Agenda.
……

8. Number of inter-sectoral partners initiated in advocacy meeting/any other activity for prevention control of malaria or other VBDs; give names of the organizations and details of the activity…….
…….

9. Number of NGOs/FBOs/CBOs/Local Self-Government involved in AMM activities. Details of the organizations and activities. ……
…….

10. Type of communication employed/disseminated for social mobilization; key themes; languages used; locations/ timing of implementation.
…….

Electronic/multi media
- TV: national/regional/local
- Radio: national/regional/FM/local
- Music: video/soap operas
- Any other

Print media
- Newspapers
- Pamphlets/leaflets/booklets
- Flip charts/flash cards
- Posters/stickers
- Any other

Other media
- Banners
- Hoarding
- Wall writing
- Bus panels/Train coaches
- Public announcements /miking /drum beating
- Any other

Inter-personal communication
- Group meetings
- One-on-one meetings
- Door-to-door visits
- Song & drama
- Street play/skits
- Exhibition/health mela
- Any Other

Procurement source of communication materials (own/supplied)? If supplied, when received? Is the quantity adequate? ……..……

Is there adequate supply of anti-malaria drugs, other logistics? Any constraints? ……

What is the IRS schedule? When and how the advance information was disseminated to the community? Has the first round of spray started/completed? Any constraints? .....

Any re-orientation training programme organized for health sector personnel including training for Block Extension Educator/ non-health sector personnel initiated? Type and details…….

Is there an adequate mobilization of DDGs/FTDs/MLVs other community volunteers as well as peripheral health workers? How it was achieved? ……..…..

Any action/support required form State/Central Govt. If yes, please specify……...….

For Subcentre/Village levels the following queries may be added.

Total population of the area; Number of blood examinations [active/passive (including camps at weekly markets)]; Blood examinations for malaria during the AMM?
……..……..….

Number of fever cases given presumptive treatment, PRT, RT? ……..

Number of severe/complicated malaria cases in the last six months? Action taken.
……..……
……
……

Number of deaths, if any. Action taken.
…….....
.....

Name & signature of observer
Designation

Annex 15

NATIONAL VECTOR BORNE DISEASE CONTROL PROGRAMME

M-1: Report of malaria surveillance by ASHA / health care provider / health facility

Year: …… Month …… Fortnight I / II ……

* *All cases of suspected malaria should be recorded in this form, irrespective of whether they are tested or treated.*

* *Start with patient number "1" each month. Use more than one sheet per fortnight, if needed and mention sheet number. Cases that presented to you during the fortnight should be included in that's form, irrespective of when fever first appeared.*

PHC: …… Subcentre: …..…… Village: …… Provider: ……

PHC code: ……..…… Subcentre code: …… Provider code: ……

Serial number	Village name	Village/ provider code	Name of patient (suspected malaria case	Head of family	Active (A) / Passive (P) case detection	Age (Years / months)	Sex (M /F)	Duration of fever (days)	Date of RDT / BSC	RDT			Blood slides					Pregnant (if yes, ✓)	Date of starting treatment	Number of tablets/packs given for treatment					Suspected severe malaria (✓)	Date of referral	If died, date of death	Verified by (signature)
										Pf positive (✓)	Pv positive (✓)	Negative (✓)	Slide number (Ser No. / Provider/ Village/SC code)	Date of dispatch to lab	Receipt date of report	Pv +ve (✓) -ve (-)	Pf_+ ve (✓) -ve (-)			CQ	PQ (2.5 mg)	PQ (7.5 mg)	ACT-SP (✓)	ACT-AL (✓)				
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29
Total																												

A. Positive results to be marked in red. ***B. Mixed infections to be marked as Pf.***

C. Use '991', '992', etc. for village code when patient is not a usual resident of your village.

Stock position	Pf RDT	Bivalent RDT	CQ	PQ (2.5 mg)	PQ (7.5 mg)	ACT-SP (Pink)	ACT-SP (Yellow)	ACT-SP (Green)	ACT-SP (Red)	ACT-SP (White)	ACT-AL (Yellow)	ACT-AL (Green)	ACT-AL (Red)	ACT-AL (White)	Slides	Lancets	Verified by (Signature)
Opening balance																	
Received during fortnight																	
Total of above																	
Utilization during fortnight																	
Closing balance																	

NATIONAL VECTOR BORNE DISEASE CONTROL PROGRAMME

M-2: Slide examination request to laboratory

(For the use of ASHA/village level volunteer/MPHW)

Village: …… Village code: ……. Provider code …… Subcentre …….

* *Fill the form in duplicate.*
* *Fill the columns 1 to 7 and send one copy of the form to the lab along with the slide(s)*
* *Fill the form even if there is only one slide*
* *Columns 8 to 11 to be filled by the LT and the form returned to the provider*
* *Once the form is received back from the laboratory, enter the results in your form and also fill the date the form is received back in column 12.*

Slide No.	Name of patient	Age	Sex	Duration of fever	Active/ passive	Date of dispatch	Date of receipt in lab	Pv: Positive (✓) Negative (-)	Pf: Positive (✓) Negative (-)	Feedback on quality of smear by LT (Good/Satisfactory/Poor)	Date result received back by provider
1	2	3	4	5	6	7	8	9	10	11	12

NATIONAL VECTOR BORNE DISEASE CONTROL PROGRAMME

M-3: Laboratory register of slide examination in laboratory

District: …… Subcentre ……..

Serial Number	Date of examination	Village code	Provider code	Slide number	Name of patient	Age	Sex (M/F)	Duration of fever	Date of dispatch of slide to lab	Date of receipt of slide in lab	Pv	Pf (R/G/RG)	Date of sending result to provider	Remarks
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15

In cases of RDT done at the PHC laboratory, entries will be made, except in columns 5, 10 & 11.

R: Ring stage G: Gametocytes RG: Ring stage and Gametocytes

NATIONAL VECTOR BORNE DISEASE CONTROL PROGRAMME

M-4: Fortnightly report of malaria surveillance from subcentre / PHC / district / State

Subcentre/PHC ………………… Subcentre code ………. Year: …………… Month: ……………… Fortnight I / II …………………

S. No	Village/SC/PHC/District/State name	Village/SC/PHC/District/State code	Population	Total fever cases recorded in fortnight in M-1	No. of RDTs performed	No. of Pf positive by RDT	No. of Pv positive by RDT	No. of mixed infections detected by RDTs	Total positive cases detected by RDT	No. of slides taken	No. of slides examined	No. of slides examined in PCD	No. of slides reported within 24 h	No. of Pf positive by microscopy	No. of Pv positive by microscopy	No. of mixed infections detected by microscopy	Total malaria positives detected by microscopy	Total Pf detected by RDT + microscopy	Total Pv detected by RDT + Microscopy	Total mixed infections detected by RDT + microscopy	Total malaria cases detected by RDT + Microscopy	No. of slides positive in PCD	Malaria Cases 0-4 years (Male)	Malaria Cases 0-4 years (Female)	Malaria cases 5-14 years (Male)	Malaria cases 5-14 years (Female)	Malaria cases ≥ 15 years (Male)	Malaria cases ≥ 15 years (Female)	Malaria cases (Pregnant women)	Severe cases treated	Outbreaks reported (Y/N)	No. of cases referred	No. of deaths due to malaria	Name/Age/Sex of death case
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35
MPHW (M)																																		
MPHW (F)																																		
Subcentre (Total)																																		
PHC																																		
Total																																		

Stock position	Bivalent RDT	CQ	PQ (2.5 mg)	PQ (7.5 mg)	ACT-SP (Pink)	ACT-SP (Yellow)	ACT-SP (Green)	ACT-SP (Red)	ACT-SP (White)	ACT-AL (Yellow)	ACT-AL (Green)	ACT-AL (Red)	ACT-AL (White)	Inj. Artesunate	Inj. Arte mether	Inj. Arteether	Slides	Lancets	Verified by (Signature)
Opening balance																			
Received during fortnight																			
Total of above																			
Utilization during fortnight																			
Closing balance																			

NATIONAL VECTOR BORNE DISEASE CONTROL PROGRAMME

VC-1: Primary record of IRS

(Superior Field Worker's diary)

Village: …… Village code: ……..……. Subcentre …… PHC ……..……
Round I / II …….. Planned date ……/……/……. Date of spray ……./……./…….. Insecticide ……..
Code of squad ……..…… Name of SFW ……. Name of FWs: FW-1. ……..……
FW-2: …….. FW-3: …… FW-4: …… FW-5: ……

Summary

	Total number	Partially covered	Completely covered	% covered
Houses				
Rooms				
Population				

Sprayed houses only

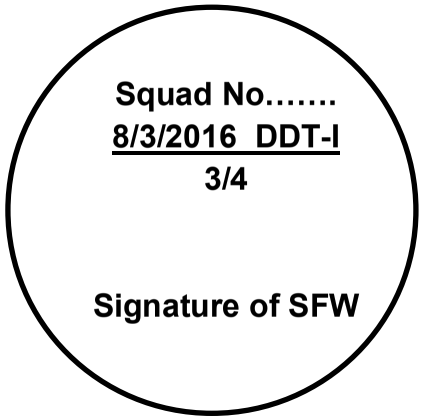
Serial No.	Head of family	No. of inhabitants	Total rooms	Rooms completely sprayed	Rooms partially sprayed	Rooms refused	Rooms locked	Remarks
1								
2								
3								
4								
5								
6								
7								
8								
9								
10								
Total								

Pumps issued: …… Pumps functional ……..
Insecticide received …….. Insecticide used …… Insecticide balance ……..
Name & Signature of SFW …….. Name & Signature of MPHW ……..

NATIONAL VECTOR BORNE DISEASE CONTROL PROGRAMME
VC-1S: Wall stencil

Squad number ……
Date ……
Insecticide ……
Spray round ……
Sprayed rooms ……
Signature of SFW ……

Example



Date of spray: 8 March 2016
Insecticide: DDT
Round No: 1st round
Number of rooms sprayed in the house:3
Total number of rooms in the house: 4

NATIONAL VECTOR BORNE DISEASE CONTROL PROGRAMME

VC-2: IRS output report

Round Number: ……. **Name of insecticide: ……**

Name of village/Subcentre/ PHC	Village code	Total population	Planned date for spray	Date(s) of spray done	Squad code	Quantity of insecticide received	Quantity of insecticide used	Balance quantity of insecticide	Total number of houses	Number of houses sprayed	Percentage of houses sprayed	Total number of houses	Rooms completely sprayed	Rooms partially sprayed	Percentage of rooms completely sprayed	Population in sprayed houses	Percentage of population protected
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
Subcentre 1																	
Village 1																	
Subcentre 2																	
Village 2																	
Village n																	
PHC total																	

Signature of MO-PHC

Date of dispatch/approval ……..

District report only

Spray squads required: …….. Spray squads present …….

Spray pumps required: ……. Spray pumps available …… Spray pumps certified functional by DVBDCO/CMHO/CDMO ……

NATIONAL VECTOR BORNE DISEASE CONTROL PROGRAMME

VC-3: Primary record of bed net delivery and impregnation

Village: …… Village code ……. Subcentre …… PHC ……

Planned date(s) of survey …….. Actual date(s) of survey …….

Planned date(s) of impregnation …….. Actual date(s) of impregnation …….

Planned date(s) of distribution ……. Actual date(s) of distribution …….

Name of volunteer/ASHA/AWW ……

Total number of houses …… Number of houses having at least two effective bed nets ……

S. No	Name of head of household	Number of persons living in household	Number of LLINs required for total coverage				Number of LLINs within their lifespan available				Number of LLINs distributed				No. of ITNs available	Number of ITNs distributed	Number of ITNs treated (out of columns 16 and 17)	Total number of bed nets within their lifespan (Columns 11 + 15 + 18)
			Size - I	Size - II	Size – III	Total	Size - I	Size - II	Size - III	Total	Size - I	Size - II	Size - III	Total				
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19

Size I: Size II: Size III:

*** LLINs within their lifespan only should be counted**

Quantity of synthetic pyrethroids available before impregnation …… Quantity utilized for impregnation …….

Volunteer's name and signature

……

Health worker's name and signature

……

NATIONAL VECTOR BORNE DISEASE CONTROL PROGRAMME

VC-4: Bed net output report

Name of district / PHC ……

Name of PHC/subcentre/village targeted for bed net impregnation	Village code	Total population	Total number of houses	Number of bed nets required for total coverage	Planned date of survey	Actual date of survey	Planned date of distribution	Actual date of distribution	Planned date of impregnation	Actual date of impregnation	Number of ITNs noted in survey	Number of ITNs distributed	Number of ITNs available for use	Number of Size I LLINs in survey	Number of Size II LLINs in survey	Number of Size III LLINs in survey	Number of Size I LLINs distributed	Number of Size II LLINs distributed	Number of Size III LLINs distributed	Number of Size I LLINs available for use	Number of Size II LLINs available for use	Number of Size III LLINs available for use	Number of ITNs + LLINs available for use	Number of households with at least two effective bed nets	% of Population coverage (% of households with at least 2 effective bed nets)
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26
SC																									
SC																									
PHC																									

*** LLINs within their lifespan should only be counted**

NATIONAL VECTOR BORNE DISEASE CONTROL PROGRAMME

VC-5: District annual stock report on insecticides

Name of district …… Year ……..

Name of PHC	Insecticide	Opening balance as on 1st Jan	Date of expiry of stock in Col 3	Quantity received during the year	Date of expiry of item in Col 5	Total available (Columns 3 + 5)	Quantity used in 1st round	Quantity used in 2nd round	Quantity used in 3rd of Malathion	Total quantity used in all rounds	Quantity life expired	Closing balance as on 31st Dec	Disposal of expired insecticide	Remarks
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
PHC-1	DDT													
	Malathion													
	Pyrethroids													
PHC-2	DDT													
	Malathion													
	Pyrethroids													
PHC-n	DDT													
	Malathion													
	Pyrethroids													
District store	DDT													
	Malathion													
	Pyrethroids													
District total	DDT													
	Malathion													
	Pyrethroids													

NATIONAL VECTOR BORNE DISEASE CONTROL PROGRAMME
VC-6: District LLIN log

Name of subcentre/village	Number of LLINs distributed by year (with sizes)															
	2015				2016				2017				2018			
	I	II	III	Total	I	II	III	Total	I	II	III	Total	I	II	III	Total
Subcentre 1																
Village 1																
Village 2																
Village n																
Subcentre 1 total																
Subcentre n																
Village 1																
Village n																
Subcentre n total																
PHC total																

NATIONAL VECTOR BORNE DISEASE CONTROL PROGRAMME
Programme management monitoring report for quarter …….

A. Monitoring and evaluation

S. No	District/ State	Activities	Norm	Total number of activities conducted in the quarter	Specify details (Date of meeting; and dates and names of villages visited)
1		Quarterly review of districts by State (in first month of quarter)	1 per quarter		
2		Monthly review of NVBDCP under chairmanship of district	1 per month		
3		Field visits by DVBDCO	Minimum 10 days per		
4		Field visits by district consultant	Minimum 10 days per		
5		Field visits by MTS	Minimum 15 days per		

B. Quality of services

S. No	Indicators	DVBDCO		DVBDC		MTS	
		Number	%	Number	%	Number	%
1	Number of diagnosed Pf cases visited by supervisory staff (at least 2 patients per visit)						
2	Number of cases found positive for Pf who received treatment within 1 day of reporting to the health provider						
3	Number of bed net beneficiaries visited (at least 2 beneficiaries						
4	Number of bed net beneficiaries visited who slept under the bed net the previous night						
5	Number of houses visited in IRS targeted villages (at least 2 households per visit)						
6	Number of houses visited in IRS targeted villages which had complete good quality spray						

C. Training

S. No	District/ State	Category of staff	Total number sanctioned	Total number in position	Total number of courses in the quarter	Date(s) of training	Total number trained in the quarter	Total trained in the plan year
1		DVBDCO						
2		DVBDC consultant						
3		Medical specialist						
4		Private practitioner (IMA, NGO						
5		MO-PHC / MO-CHC						
6		MTS						
7		LT (induction)*						
8		LT (reorientation)*						
9		Health supervisor (M)						
10		Health supervisor (F)						
11		MPHW (M)						
12		MPHW (F)						
13		ASHA						
14		Community volunteers other than						
15		Others (specify)						

** Data to be obtained from RD office*

D. BCC campaign for malaria control

S. No	Activities & related details	State	District	Block	Municipal corporation (other than District/ Block HQ	Municipal Council/ Town areas (other than District/ Block HQ	Subcentre	Village
1	**Major activity: Advocacy workshops at**							
	Number							
	Organization(s)/institution(s) responsible for							
	Number of participants (attach list)							
	Number of organizations who carried out activities on prevention and control of VBD (attach details)							
	Expenditure incurred							
	Remarks							
II	**Major activity: Intersectoral coordination**							
	Number							
	Organization(s)/institution(s) responsible for							
	Number of participants (attach list)							
	Number of organizations who carried out activities on prevention and control of VBD (attach details)							
	Expenditure incurred							
	Remarks							
III	**Major activity: Programme communication**							
A	Print media (newspaper advertisements, poster, leaflets/handbills/pamphlets, gate folders, stickers, booklets, calendars, brochures, banners, flip charts, flash cards, any other)							
	Number							
	Organization(s)/institution(s) responsible for							
	Number of organizations who carried out activities on prevention and control of VBD (attach details)							
	Expenditure incurred							

S. No	Activities & related details	State	District	Block	Municipal corporation (other than District/ Block HQ	Municipal Council/ Town areas (other than District/ Block HQ	Subcentre	Village
	Remarks							
B	Electronic media (Television-National/ Regional/Cable, Radio-National/Regional/ FM/Local, Cable/Satellite network, cinema slides, videos, cassettes/CDs, any other)							
	Number							
	Organization(s)/institution(s) responsible for implementation							
	Number of organizations who carried out activities on prevention and control of VBD (attach details)							
	Expenditure incurred							
	Remarks							
C	Outdoor publicity (Hoardings, wall paintings/signs, DDC/FTD signboards, glow signs, tin plates, public announcements/miking/drum beating, exhibition, health mela, any other)							
	Number							
	Organization(s)/institution(s) responsible for							
	Number of participants (attach list)							
	Number of organizations who carried out activities on prevention and control of VBD (attach details)							
	Expenditure incurred							
	Remarks							
D	Folk media and interpersonal communication (group meeting, door to door campaigns, plays, skits, song & drama, Q & A sessions, any other)							

S. No	Activities & related details	State	District	Block	Municipal corporation (other than District/ Block HQ	Municipal Council/ Town areas (other than District/ Block HQ	Subcentre	Village
	Number							
	Organization(s)/institution(s) responsible for implementation							
	Number of participants (attach list)							
	Number of organizations who carried out activities on prevention and control of VBD (attach details)							
	Expenditure incurred							
	Remarks							
IV	**Major activity: Monitoring & evaluation**							
A	**Concurrent evaluation**							
	Number (attach state-wise/district-wise compiled							
	Organization(s) / institution(s) responsible							
	Expenditure incurred							
	Remarks							
B	**Consecutive evaluation**							
	Number (attach state-wise/district-wise compiled							
	Organization(s) / institution(s) responsible							
	Expenditure incurred							
	Remarks							

E. District-wise logistic monitoring (Stock position as on quarter ending ……)

S. No	District/PHC	Tab. Chloroquine	Tab. Primaquine (2.5 mg)	Tab. Primaquine (7.5 mg)	Tab. Quinine sulphate	ACT-SP (Pink pack)	ACT-SP (Yellow pack)	ACT-SP (Green pack)	ACT-SP (Red pack)	ACT-SP (White pack)	ACT-AL (Yellow pack)	ACT-AL (Green pack)	ACT-AL (Red pack)	ACT-AL (White pack)	Inj. Artesunate	Inj. Artemether	Inj. Arteether	Inj. Quinine	Pf RDT	Bivalent RDT	DDT 50% (Kg)	Malathion 25% wdp (L)	Malathion technical (L)	Temephos 50% (L)	Pyrethrum extract 2% (L)	Pirimiphos methyl (L)	SP for IRS (Kg)	SP for ITN (L)	ITN	LLIN
Total																														

Whether all peripheral institutions have percentage adequate stock of drugs and commodities. Yes/No
Number and percentage of facilities (PHCs, SCs, ASHAs) visited by district personne/MTS where stock-outs were observed. No. …… % ……..

Above information may be sent to Directorate of NVBDCP by e-mail/Fax

Annex 16

Roles and responsibilities of functionaries at all levels

1. ASHA

The responsibilities of ASHA in relation to malaria prevention and control are as follows:

A. Early diagnosis and complete treatment

- Be the first point of contact for fever cases in the village.
- Perform RDT and take blood smear in slides in fever cases
- Arrange for transportation of slides to the laboratory and to get back results back
- Provide treatment to patients based on results of RDT or microscopic examination
- Observe all precautions while collecting blood for RDT or making smear, i.e. using sterilized needles, clean slides, etc.
- Identify warning signs of severe malaria and ensure timely referral of such cases with adequate pre-referral care, to the nearest First Referral Unit (FRU) such as a nearby Block PHC with inpatient facility or district hospital after making blood smear and performing RDT
- Arrange funds from NRHM flexipool for transportation of severe malaria cases
- Identify any increase in the number of fever cases in the community and provide prompt information of fever outbreak to the MPHW, MO-PHC, BMO / DVBDCO / Nodal Officer-IDSP.

B. Vector control

- Work in close coordination with MPHW and MTS of the area to ensure adequate mobilization of the community for acceptance of IRS before the rounds
- Provide prior information on IRS to the community and village opinion leaders, 7 days in advance and then again one day before the spray
- Assist the MPHW and MTS in selection of sites for dumping of insecticides.

C. IEC / BCC

- Educate the community about signs and symptoms of malaria, its treatment, prevention and vector control
- Undertake advocacy for vector control, e.g. spreading awareness on source reduction activities and improving utilization of ITNs.
- Participate in camps organized for insecticide treatment of bed nets.
- Participate in all village-level activities planned for the antimalaria month.

D. Recording and Reporting

- Maintain record of fever cases in M-1 and provide fortnightly report of the same to the MPHW.

E. Village Health Sanitation and Nutrition Committee (VHSNC)

- Be a member of the Committee and take active part in its meetings and contribute to the discussions

2. Multi-purpose Worker - Male (MPHW - M)

A. Early diagnosis and complete treatment

- Conduct weekly domiciliary house-to-house visit, in areas where ASHAs have not been deployed, as per schedule developed by MO-PHC
- Collect blood smears (thick and thin) or perform RDT from suspected malaria cases during domiciliary visits and keep the records in M-1.
- Transport slides collected along with M-1 to the laboratory for examination.
- Provide treatment to positive cases as per the drug policy.
- Identify warning signs of severe malaria and ensure timely referral of such cases with adequate pre-referral care, to the nearest referral institution such as block PHC or district hospital after making blood smear and performing RDT
- Arrange funds from NRHM flexipool for transportation of severe malaria cases
- Contact the ASHAs during village visits and collect blood smears and M-1 for sending to the laboratory
- Cross verify ASHA's records by visiting patients diagnosed positive between the previous and current visit
- Replenish the stock of microscopy slides, RDKs and drugs to ASHAs wherever necessary
- Maintain record of blood smears collected and patients given antimalarials in M-1
- Take all precautions to use properly sterilized needles and clean slides while collecting blood smears.

B. Vector control

- Take decision on dumping sites for insecticides
- Supervise the work of spray squads
- Deploy the spray squads in such a way that they work in adjacent houses for convenience of supervision.
- Make a report in prescribed proforma about insecticide consumed, squads deployed, and human dwellings sprayed, missed, locked, refused and rooms sprayed/rooms missed

- Ensure that the spray is of good quality in all human dwellings
  - Spray should be uniform with the deposits in small discrete droplets
  - All sprayable surfaces - like walls, ceilings and eaves should be covered.
  - If the ceiling is thatched, it should be sprayed so as to cover both sides of rafters/bamboos, and if necessary the ceiling should have two coats each starting from opposite direction.
  - All false ceilings and attics should be sprayed.
  - If houses are built on stilts/platforms, the under surface of platform should also be covered.
- Put a stencil on the wall of the house indicating spray status of the human dwelling (all rooms and verandas should be counted)
- Ensure that spray men use protective clothing and wash the spray equipment daily.
- Ensure that washing of the equipment does not pollute drinking water sources or water used for cattle.
- Ensure that spray men wash exposed parts of their body with soap and water, after spray work
- Ensure that all precautions are taken by spray men to avoid contamination of food material or cooked food or drinking water in the house by covering these with a plastic sheet. Similarly, fodder for animals should be protected.

C. IEC/ BCC

- Educate the community about signs and symptoms of malaria, its treatment, prevention and vector control.
- Provide advance information on spray dates to the community/villages
- Participate in the antimalaria month activities

D. Recording and reporting

- Maintain record of fever cases diagnosed by blood slides and RDTs in M-1 and prepare a subcentre report (M-4) for all cases in the area, including those of ASHAs and submit it to PHC.
- Maintain the record of supervisory visits in tour diary and submit to MO-PHC during monthly meetings for verification.
- Maintain all other records to be maintained in subcentre and forward reports to PHC by due date

E. VHSNC

- Be a member of the Village Health, Sanitation, and Nutrition Committee and take active part in its meetings and lead the discussions.

3. Multi-purpose Worker - Female (MPHW-F)

MPHW (F) is primarily responsible for collecting blood smears from suspected cases of malaria from all antenatal and postnatal cases under her care as well as from infants. In malaria endemic areas where the MPHW (M) post is vacant, and trained ASHAs are not available in villages, she is expected to carry out active case detection of malaria.

A. Early diagnosis and complete treatment

- Collect thin and thick smears and perform RDT in all women suspected to be malaria cases during her antenatal and postnatal visits and maintain the records in M-1.
- Refer all pregnant women with confirmed malaria to the MO-PHC as malaria can lead to serious complications in pregnancy and also high mortality.
- Administer antimalaria treatment as per drug policy
- During house visit collect blood smear and perform RDT of fever cases and those with history of fever in the past two weeks
- Take/arrange to send blood smears to laboratory the same day/or early next day
- Obtain blood examination results from laboratory and give treatment to positive cases
- Make sure that primaquine is not administered to pregnant women and in postpartum period up to 30 days and also to children below one year of age
- Identify warning signs of severe malaria and ensure timely referral of such cases with adequate pre-referral care, to the nearest referral unit with facilities for treatment of such cases, i.e. block PHC or district hospital after making blood smear and performing RDT
- Arrange funds from NRHM flexipool for transportation of severe malaria cases

C. IEC / BCC

- Educate the community about signs & symptoms of malaria, its treatment, prevention and vector control
- Provide advance information on spray dates to the community/villages
- Participate in the anti-malaria month activities

D. Recording and reporting

- Maintain record of fever cases diagnosed by blood slides and RDTs in M-1 and provide it to MPHW-M
- Maintain a record of supervisory visits in tour diary and submit it to MO-PHC during monthly meetings for verification

4. Malaria Inspector

The malaria inspector will function under the technical and administrative supervision of DVBDCO. The DVBDCO allocates PHCs for each malaria inspector for supervision and implementation of malaria control. His responsibilities include:

- Plan and supervise IRS activities and anti-larval operations.
- Tour for 15 to 20 days in a month for field supervision
- Ensure that the field staff i.e. SFWs and MPHWs carry out their assigned work
- Maintain spray records and submit monthly reports (VC-1, VC-2, VC-3 and VC-4
- Maintain stock registers of insecticides and larvicides
- Assist in epidemic containment measures and also assist in record maintenance and reporting.
- Ensure complete treatment of cases
- Ensure complete coverage and quality of insecticidal spray
- Train seasonal spray staff in correct technique of suspension preparation and insecticide spray for a period of two days

5. Health supervisor

A. Supportive supervision

- Supervise all activities of MPHW (M).
- Conduct concurrent and consecutive supervision of domiciliary visits of MPHW (M).
- Ensure that MPHWs (M) contact CHVs regularly; and if the post of MPHW (F) is vacant, they contact the ASHAs also.
- Administer radical treatment to all positive cases found during the supervisory visit.
- Refer seriously ill cases to the referral centre.
- Help in organizing and supervising the spray operations, where required.
- Ensure that the MPHW (M) gives advance information on spray to the villagers
- Motivate householders who refuse spray in to accepting the spray.
- Ensure good quality of spray operations and maintain insecticide records

B. IEC/ BCC

- Educate the community about signs and symptoms of malaria, its treatment, prevention and vector control.
- Provide advance information on spray dates to community/villages
- Participate in the anti-malaria month activities

C. Recording and reporting

- Maintain record of fever cases diagnosed by blood slides and RDTs in M-1 and provide it to MPHW (M) during supervisory visits of subcentres
- Keep a record of supervisory visits in tour diary and submit to MO-PHC during monthly meetings for verification.
- Immediately inform unusually high incidence of fever or malaria cases to MO-PHC

6. Laboratory Technician (LT)

- Carry out malaria microscopy according to the national guidelines and norms.
- Receive the blood slides from health workers or ASHAs along with the M-3 and also prepare blood slides from fever cases referred from OPD.
- Stain, examine and give report of all slides on the same day they are received
- Maintain laboratory record of slide examination (M-3) up-to-date
- Send report on slides received from outside the facility, by SMS followed by confirmation on report form
- Follow national quality assurance protocol in the laboratory
- Ensure that supplies for malaria microscopy are never out of stock
- Maintain the microscope in good working condition, and if there is a problem with the microscope that the LT cannot fix, send a written report immediately to the district LT
- Assist the MO-PHC / MTS in preparation of monthly case finding report
- Train peripheral health workers in taking slides and performing RDTs.
- Carry out other duties related to malaria or other laboratory functions as required by BMO or block laboratory supervisor
- Report to the MO in charge on a regular basis

7. Malaria Technical Supervisors (MTS)

A. Supportive supervision

- Provide supportive supervision to health workers, volunteers and field staff responsible for vector control operations, especially IRS and ITN/LLIN distribution.
- Regularly assess the coverage of case management activities and work with the local health authorities and other sectors to improve access, where needed.
- Draft annual plans for malaria control in the area of responsibility and submit them to the district VBDC officer.
- Manage the timely implementation of the approved annual malaria control plan in the area of responsibility including logistics, training, communication, and quality assurance.
- Ensure the implementation of malaria surveillance based on NVBDCP norms, serving as the frontline professional for the early detection of outbreaks and special problems and ensuring that feedback is provided to cadres and health workers involved in malaria control.

- Visit all the PHCs (block and additional) and designated microscopy centres in the area of responsibility once every fortnight, sentinel centres once a month, and subcentres and 10% of remote villages once every two months with additional visits to villages with epidemiological or operational problems.
- During visit to subcentres, visit remote villages and interview ASHA and 2 patients treated by ASHA in the last one month (to verify her records).
- Guide health workers and volunteers in the planning of outreach services including ACD
- Check the quality of malaria case management at all levels including recording, reporting and commodities management during visits to health facilities, health workers and volunteers and through home visits to malaria cases.
- Fill the supervisory checklist during each field visit in triplicate; of these one copy is filed in the PHC, one is submitted to the DVBDCO and the last is for MTS's own record.
- Supervise the quality and coverage of IRS and LLIN/ITN operations in the field.
- Check completeness and correctness of recording and reporting, and undertake primary analysis of malaria data
- Ensure timely submission of reports through the BMO and channelling surveillance feed-back from the district to BMO and subcentres
- Communicate regularly with the affected communities, their leaders, administrative authorities at block level and representatives of other sectors to respond to their needs and to recruit their support for malaria control.
- Assist the MO-PHC in training of ASHAs and MPHWs.

B. Reporting

- Submit monthly advance tour program by last Monday of preceding month for approval by the DVBDCO.
- Submit tour diary, supervisory checklist and log book for verification to DVBDCO each month.
- Provide supportive supervision to non-medical staff responsible for case management and surveillance and to vector control staff
- Report to the BMO regularly

8. Medical Officer - Primary Health Centre (MO-PHC)

The MO-PHC should be well trained and is responsible for carrying out the following activities.

A. Early diagnosis and complete treatment

- Make a fortnightly calendar for house-to-house visit of MPHW (M).
- Refer all suspected malaria cases to the laboratory for blood smear collection and examination before starting treatment

- Ensure that the LTs maintain the M-3 register and also other charts and graphs showing subcentre-wise and provider-wise data on blood smear collection, examination and positive cases
- Ensure that all positive cases get treatment as per drug policy within 24 hours of reporting with fever
- Ensure sufficient stocks of antimalarials are available in the PHC and periphery.
- Analyse data for action and prediction of outbreak and also assist in epidemiological investigation based on weekly fever surveillance report
- Arrange for referral and transportation of severe malaria to the district hospital
- Monitor therapeutic failure in malaria cases (failure of response to Chloroquine or ACT) and inform the district and state headquarters immediately.
- Ensure that records of clinically diagnosed cases are maintained.
- Undertake trainings of health supervisors, MPHWs and ASHAs in the PHC area.

B. Vector control

- Ensure that spray operations are conducted as per schedule and in case of any delay, find out the reasons and reschedule the programme.
- Assist the DVBDCO in preparation of supervisory plan for the PHC area.
- Solve any bottlenecks in spray operations in his area such as turnover of seasonal spray workers (field workers), insecticide supplies, shifting of camps, etc.
- Ensure timely submission of reports.
- Contact DVBDCO immediately in case of delay/suspension of spray programme and solve the problems.
- Inspect spray operations during field visits, at least once a week.

C. Supportive supervision

- Visit all PHCs and microscopy centres in the area of Block PHC once a month and monitor sentinel sites once a month.
- Visit all subcentres once in 2-3 months and during these visits, visit remote villages and interview the ASHA and 2 patients treated by ASHA in the last one month (crosscheck ASHA's records)
- During supervision of all malaria clinics and PHC laboratories in his area, see the quality of blood smear collection, staining, efficiency of microscopic examination and check whether the stain is filtered daily, look into the condition of microscope and other equipment, stains, glass slides, etc.
- While on tour, verify that MPHW (M), MPHW (F) and ASHA carry out malaria case detection as laid down in this manual.

D. IEC/ BCC

- Plan for anti-malaria month activities with DVBDCO.
- Plan for IEC before spray operations, to improve their acceptance.

E. Recording and reporting

- Ensure that records of all fever cases examined and found positive are maintained in the laboratory.
- Ensure that all MPHWs submit the monthly subcentre report and the PHC prepares the subcentre-wise report on M-4 and submits it to the district.
- Guide the Arogya Raksha Samiti (hospital management committee) in utilization of the NHM untied funds as and when imperative for malaria treatment / prevention related activities.
- Procure, after getting permission from DVBDCO, artesunate / quinine injections or other antimalarials when the supplies do not reach in time

9. Assistant Malaria Officer (AMO)

The AMO works under the technical control of the DVBDCO and is expected to perform the following duties.

- Assist in chalking out fortnight domiciliary visit programme of MPHWs.
- Assist in working out insecticide requirements, their dumping programme and other aspects of logistics.
- Assist in organization and supervision of spray operations.
- During field visits, carry out consecutive and concurrent supervision of both case detection and spray operations.
- Assist in preparation of reports and returns and ensure that these are sent regularly.
- Assist DVBDCO in all other technical and administrative functions connected with malaria control in the district.

10. District Vector Borne Disease Control Consultant (DVBDC consultant)

The overall purpose of DVBDC consultant is strengthening planning, monitoring, supervision and evaluation of VBD control in high malaria endemic districts and to ensure seamless collaboration between the state and district.

A. Early diagnosis and complete treatment

- Ensure that the MO-PHC prescribes antimalarial treatment only after getting positive results in fever cases referred to the laboratory for blood examination by microscopy

- Sensitize the MO-PHC, MPHWs and ASHAs on timely referral of severe malaria cases.
- Assist the DVBDCO in ensuring that all microscopy centres in the district are functional by positioning of LTs.
- Ensure sufficient stocks of antimalarials in PHC and periphery.
- Assist the DVBDCO in analysing data for action and prediction of outbreak and also assist in epidemiological investigation based on weekly fever surveillance report.
- Monitor therapeutic failure in malaria cases (failure of response to Chloroquine and ACT) and inform the district and state headquarters immediately.
- Ensure that records of clinically diagnosed cases are maintained.
- Along with MO-PHC, undertake trainings of health supervisors, MPHWs and ASHAs.

B. Vector control

- Provide technical support to DVBDCO, BMOs and MTSs for the preparation of district and sub-district plans for control of malaria and other vector borne diseases.
- Supervise IRS micro-planning and implementation to ensure quality and coverage.

C. Supportive supervision

- Ensure that the programme guidelines for planning, training, service provision, monitoring, supervision, and surveillance of VBDs are followed in all health facilities and by all health workers concerned in the district.
- Work with state and district-level officers to establish good practices of supportive supervision in the district for the control of VBDs.
- Conduct regular field visits for ensuring quality implementation of the programme and provide technical support to the concerned staff on site, including ongoing on-the job training and supportive supervision of MTSs.
- Visit all sentinel surveillance sites once a fortnight and 50% of PHCs in a month.
- Visit subcentres and supervise MPHWs, ASHAs and make patient visits.
- Supervise the VBD control logistics of diagnostics, drugs and insecticides so as to ensure against stock-outs.
- Ensure that FEFO principle is followed in commodity utilization.

D. IEC / BCC / Intersectoral collaboration

- Actively seek involvement of district collector, district administration, NGOs, CBOs and the private sector (health and non-health) under various schemes.

- Assist the DVBDCO and specialized staff in development of the BCC/ IEC plan for the district with special emphasis on IPC tools and innovations in BCC / IEC.
- Ensure timely data analysis, presentation and interpretation for VBD surveillance at district level.

E. Records and reports

- Ensure timely preparation of annual report and plan on VBDs.
- Ensure timely submission of district level reports to state.
- Participate in all district and state level meetings held to review the situation of VBDs.
- Submit a monthly advance tour program by 7th of the month to Directorate of NVBDCP and states. Maintain tour diary and vehicle log book for each month.
- Submit monthly activity report to Directorate of NVBDCP and SPO.

11. District Vector Borne Disease Control Officer (DVBDCO)

A. Early diagnosis and complete treatment

- Sensitise all MOs-PHC to prescribe antimalarials only after suspected malaria cases are confirmed as malaria cases by microscopy/RDT examination.
- Sensitise MOs-PHC, MPHWs and ASHAs on timely referral of severe malaria cases
- Ensure that all microscopy centres in the district are functional by positioning of LTs.
- Ensure sufficient stocks of antimalarials are available in PHCs and with other peripheral health care providers.
- Analyse data for action and prediction of outbreak and also assist in epidemiological investigation based on weekly fever surveillance report.
- Monitor therapeutic failure in malaria cases (failure of response to Chloroquine/ACT) and inform the state headquarters immediately.
- Ensure that records of clinically diagnosed cases are maintained.
- Along with MO-PHC and DVBDC consultant organize trainings of health supervisors, MPHWs and ASHAs in the PHC area.

B. Vector control

- Prepare the district and sub-district micro-action plan with assistance from DVBDC consultant, BMOs and MTSs for control of malaria and other VBDs.
- Supervise IRS micro-planning and implementation to ensure quality and coverage.
- Ensure that supervisory plan for monitoring of IRS is prepared and followed in each PHC.

- Make arrangements for transport of insecticides to dumping stations well in time.
- Ensure that all spray equipment along with spare parts are purchased/repaired well in time before commencement of spray operations.
- Ensure certification of all spray equipment in the district before IRS rounds.
- Ensure that sufficient budget is available and spray workers get payment in time.
- Inform the SPO, ROH&FW and Directorate of NVBDCP about the commencement of spray operations.
- Cover all PHCs of the district during spray inspection/supervision in each month.
- Visit and observe at least 5 to 10 villages every month to check the quality of spray.
- Ensure that complete coverage is achieved in time and space
- Submit the spray completion reports within fifteen days of round completion

C. Supportive supervision

- Ensure that programme guidelines for planning, training, service provision, monitoring, supervision, and surveillance of VBDs are applied in all health facilities and by all health workers concerned in the district.
- Work with State and district-level officers to establish good practices of supportive supervision in the district for the control of VBDs.
- Conduct regular field visits for ensuring quality implementation of the programme and provide technical support to the concerned staff on site, including ongoing on-the job training and supportive supervision of MTSs.
- Visit all sentinel surveillance sites once a fortnight and 50% of PHCs in a month.
- Visit subcentres and supervise MPHWs, ASHAs and make patient visits.
- Supervise the VBD control logistics of diagnostics, drugs and insecticides so as to ensure against stock-outs.
- Ensure that FEFO principle is followed in commodity utilization.

D. IEC / BCC / Intersectoral collaboration

- Actively seek involvement of district collector and district administration in the prevention and control of VBDs.
- Seek increased participation of NGOs, CBOs and the private sector (health and non-health) under various schemes.
- Prepare the BCC/ IEC plan for the district with special emphasis on IPC tools and innovations in BCC/ IEC with assistance from the district VBDC Consultant and specialized staff at state level.
- Ensure timely data analysis, presentation and interpretation for VBD surveillance at district level.

E. Records and reports

- Ensure timely submission of district level reports to the state.
- Prepare annual report and annual district action plan.
- Ensure that all laboratory records and reports are maintained in the district up-to-date
- Participate in all district level and state level meetings held to review the situation of VBDs.
- Maintain tour diary and vehicle log book for each month.
- Being a member of the district health society, bring to the notice of the society relevant aspects of intersectoral co-ordination.
- Prepare information as per the checklist to be reviewed by the district collector.
- Monitor the implementation of anti-malaria activities in the urban malaria schemes functioning in the district.
- Maintain regular contact with professional bodies like IMA, IAP, etc. so that national anti-malaria policy is conveyed to the private medical practitioners.

Annex 17

NATIONAL VECTOR BORNE DISEASE CONTROL PROGRAMME

Checklist for supportive supervision: SPO/DVBDCO

Visit the district and spend half a day to get the following information.

Name of the district: …….

A. General

1. Full-time DVBDCO present: Yes/No
2. Review the staff position, especially vacancies ……...
3. Epidemiological situation during the last three years ……....
4. Any outbreak reported during the last three years: Yes/No
5. Control measures initiated:

B. RDK

6. Total number of RDKs allocated to the district
7. Number of RDKs dispatched to PHCs
8. Whether national guidelines for RDK distribution: Yes/No
9. Check the RDK stock for expiry

C. Logistics

10. Proper storage facility available for RDKs and insecticides at district level: Yes/NO
11. Are all drugs and commodities within their period of expiry? Yes/No
12. Is the principle of first expiry first out (FEFO) being followed? Yes/No
13. Is the stock register being properly maintained? Yes/No
14. Has the last due consignee receipt been submitted to the state? If yes, which one.

D. Bed nets

15. Were bed nets supplied to the district in the last one year? Yes/No
16. If yes, provide the number of bed nets received.
17. Were bed nets distributed in the district during the last one year?
18. If yes, the number of bed nets distributed and are distribution records maintained?
19. Number of PHCs where bed nets were distributed in the last one year.
20. Whether bed nets were distributed in inaccessible and in poor IRS coverage PHC areas?

E. Hatcheries

21. Are hatcheries maintained in the district? Yes/No
22. Total number of hatcheries in the district.

F. NGO/PPP

23. Involvement of any NGO/PPP in the malaria programme district. If yes, mention the type of involvement.

G. Finance

24. Has the SOE has been submitted in the last month? Yes/No

Select two endemic PHCs from each from 2 districts, verify records and then go to 2 villages for IRS and bed net distribution plan (at least 2 working days in each village)

Name of PHC ……

A. General

1. Vacancy position in the PHC
2. Epidemiological situation during the last three years.
3. Any outbreak reported during the last three years: Yes/No
4. What additional inputs were provided to control the outbreak?
5. Time lag between slide collection, examination and treatment
6. Quality of microscopes, slides and reagents.

B. RDK

7. Number of RDKs received
8. Number of RDKs distributed to subcentres
9. Whether RDKs sent to inaccessible areas?
10. What is the mechanism for supervision for proper use of RDKs?
11. Is there information flow from the subcentres/villages to PHC about the results?
12. Whether ASHAs are trained for use of RDKs and treatment?

C. Logistics

13. Are adequate stocks of drugs and commodities available in the PHC? Yes/No. (Physically verify)
14. Is proper storage facility available for RDKs, commodities and insecticides? Yes/No
15. Are all drugs and commodities within their period of expiry? Yes/No
16. Is the principle of first expiry first out (FEFO) being followed? Yes/No
17. Is the stock register being properly maintained? Yes/No

D. Bed nets

18. Were bed nets supplied to the PHC in the last one year or directly to the villages? Yes/No
19. If yes, provide the number of bed nets received during last year.
20. Select 4 villages where bed nets have been distributed in large numbers.
21. Place and frequency of bed net impregnation.
22. Collect the list of 2 villages from PHC and physically verify distribution and use. .
23. Comments on community not using bed nets.

E. Hatcheries

24. Are hatcheries maintained in the PHC area? Yes/No. If yes, state the number of hatcheries.

25. Are records of hatcheries maintained subcentre and village-wise? If yes, see the records.

F. Reports

26. Have all the reports for the last completed month been submitted? If yes, see them.

Name of subcentre …….

1. Does the health worker have subcentre report of NVBDCP of the last month?
2. Number of passive slide collection and number found positive in the last month.
3. Number of active slide collection and number found positive in the last month.
4. Did the health worker take the slides collected for active case detection to the laboratory and get results back?
5. Have all slides for the last completed month been sent to the laboratory for examination? Yes/No
6. Does the health worker have the last work report of all ASHAs within the subcentre area? Yes/No
7. Are adequate stocks of drugs and commodities available at the subcentre? Yes/NO
8. Are RDKs and insecticides being stored as per guidelines?

Name of the village where ASHA was visited ……

1. Name of ASHA:
2. Is the ASHA trained in blood smear making and performing RDT? If yes, see demonstration.
3. Number of passive slide collection and number of slides found positive in last completed month.
4. Were the results of blood slides received by ASHA within 24 hours from the lab?
5. Number of fever cases who completed radical treatment in the last month?
6. Is the ASHA register for malaria programme being maintained up to date? Yes/No (Verify by seeing the register.
7. Has the ASHA submitted the last report which was due? (See the report). Yes/No
8. Was ASHA visited by the health worker in the last month and enquired about malaria cases? Yes/No
9. Does the ASHA have adequate stocks of drugs and commodities? Yes/No
10. Are there any drugs at risk of expiry? Yes/No
11. Number of RDKs used in the last month.
12. Number of fever cases found positive for malaria by RDT in the last month. Pf/Pv
13. Are RDKs being stored as per guidelines? Yes/No

Patient visit (ASHA - 1)

1. Name of patient.
2. Did the ASHA collect slides of the patient? Yes/No
3. Did ASHA perform RDT for malaria case detection? Yes/No
4. Was malaria treatment started within 24 hours of blood slide collection/performing RDT? Yes/No
5. Did ASHA tell about methods of personal protection for prevention of malaria? Yes/No
6. Was any money charged for diagnosis or treatment? Yes/No

Patient visit (ASHA - 2)

1. Name of patient.
2. Did the ASHA collect slides of the patient? Yes/No
3. Did ASHA perform RDT for malaria case detection? Yes/No
4. Was malaria treatment started within 24 hours of blood slide collection/performing RDT? Yes/No
5. Did ASHA tell about methods of personal protection for prevention of malaria? Yes/No
6. Was any money charged for diagnosis or treatment? Yes/No

IRS activity (applicable during transmission season)

1. Name of village.
2. Was prior information given to villagers about IRS round? Yes/No
3. Were the MO-PHC and MPHW (M) present to supervise the IRS round? Yes/No
4. Was route-map present with the spray squad?
5. Rate of discharge from spray equipment.
6. Name of insecticide used.
7. Is the insecticide properly stirred during the preparation? Yes/No
8. Distance of nozzle from spray surface.
9. Number of houses in the village and number of houses covered.
10. Was mud plastering done after IRS? (Ascertained during follow-up visit). Yes/No

Summary of observations

Date:

Signature:
Name:
Designation:

Plan for bed net verification by visiting nodal officer / special teams

1. At state headquarter: Select the district to be visited.

2. At district: Select 2 PHCs which have received maximum bed nets.

3. At PHCs. Select 4 villages where maximum bed nets were distributed and verify as follows by visiting about 50% of houses in each village where bed nets have been distributed.

S. No	Physical verification	Number	Percent
1	Number of bed nets actually available with the beneficiary households and the numbers distributed		
2	Whether bed nets are regularly used? Yes/No. Number of households reporting regular use and number of houses visited		
3	Whether bed nets were used the previous night? Yes/No. Number of households which used and number of houses visited		
4	Whether any pregnant woman is in the house? Yes/No. Number of pregnant women in houses visited.		
5	If yes, did she sleep under the bed net the previous night? Yes/No. Number of pregnant women who slept under bed net previous night and total number of pregnant women in houses visited		
6	Is there any child under 5 years of age in the family? Yes/No. Number of under 5 children in houses visited.		
7	If yes, did the under 5 children sleep under bed net the previous night? Yes/No. Number of under 5 children who slept under the bed net and the total number of under 5 children in houses visited		
8	Do the families have their own bed nets? If yes, when were these bed nets impregnated with insecticide last?		

Verification of ASHAs

In the villages selected for bed net verification and for supervision of IRS rounds the ASHAs are to be visited.

S. No	Physical verification	Number	Percent
1	Number of ASHAs verified		
2	Are the ASHAs trained especially on blood slide collection and RDT use? If yes, see demonstration (Number of ASHAs who successfully demonstrated the slide collection and RDT use against number of ASHAs verified		
3	ASHAs who carried blood slides to the laboratory fro examination against total number of ASHAs verified		
4	Register of ASHAs maintaining register under malaria programme up to date against total number of ASHAs verified.		
5	Have the ASHAs submitted their last due report? If yes, ask for the report. Number of ASHAs who submitted the report against total number of ASHAs verified.		
6	Do the ASHAs have adequate knowledge of antimalarial drug schedule, particularly ACT? (Number of ASHAs who remember the drug schedule against total number of ASHAs verified.		
7	Are there any drugs at risk of expiry? Number of ASHAs who had drugs at risk of expiry against total number of ASHAs verified.		
8	Is ACT supplied to ASHAs? Number of ASHAs who had ACT against total number of ASHAs verified.		

Checklist for Malaria Technical Supervisor (MTS)

PHC visit

Name of state: **Name of MTS:**
Name of district: **Date of visit:**
Name of PHC:

A. Staff position

1. LTs:	Sanctioned: ……	In position: ……
2. Health supervisors	Sanctioned: ……	In position: ……
3. MPHWs:	Sanctioned: ……	In position: ……

B. Microscopy services

1. Monocular microscopes:	Supplied: ……	Functional: ……
2. Binocular microscopes	Supplied: ……	Functional: ……

3. Number of fever cases recorded in OPD register:
4. Number of blood slides received in the lab from OPD(s) (a)
5. Number of blood slides received from periphery (b)
6. Total number of blood slides received in the lab (a + b)
7. Number of slides from OPD which were examined within 24 hours (c)
8. Number of slides from periphery which were examined within 24 hours (d)
9. Total number of slides received which were examined within 24 hours (c + d)
10. Total number of slides which were examined after a time lag of 24 hours
11. Number of slides remaining unexamined at the end of the month (backlog)
12. Have slides been sent for crosschecking in the previous month? If yes, is any feedback received and what is the feedback?
13. Names of subcentres which did not send slides to the laboratory

C. RDKs

1. Are RDKs being used at PHC for diagnosis regularly? If yes, why?
2. Number of RDKs used at PHC in the reporting period. If RDT tests proportion is higher than 10% of total suspected malaria cases tested, why? Inform MO.
3. Are there any complaints received about functioning of the RDKs? If so, have necessary action been taken?

D. Logistics

1. Are adequate stocks of antimalarial drugs available in the PHC for the next two months? If any item is in short supply, mention the name of the item.

2. During the transmission season, are adequate stocks of insecticides available for populations identified for next round of IRS?
3. Are RDKs and drugs stored properly as per programme guidelines?
4. Are insecticides stored properly as per programme guidelines?
5. Are there any drugs and commodities at risk of expiry within next 6 months?
6. Is the principle of first expiry first out (FEFO) being followed?
7. Is the indent being placed monthly?
8. How are the stocks of drugs and insecticides transported to the PHC?
9. Is the stock register being maintained and updated? Yes/No

E. Bed nets

1. Number of bed nets supplied to the PHC in the year
2. Number of bed nets distributed so far in the year
3. Are records for bed net distribution available in the PHC? If yes, scrutinize the records.
4. Has the plan for bed net distribution in the areas followed in actual distribution? Yes/No
5. Was verification of distribution to the beneficiaries done from PHC? Yes/No

F. Hatcheries

1. Number of hatcheries maintained in the PHC. If maintained, the number of functional hatcheries in the PHC area.
2. Are records of fish released in breeding sites in the PHC area maintained? If yes, see the records.
3. Are the fish replenished regularly in the potential water bodies?

G. IRS activities (in the transmission season)

1. Is the micro-action plan for IRS available at PHC? If yes, does the plan address the following?
2. What is the IRS target population in the PHC area?
3. Is the availability of the insecticide adequate for the two IRS rounds? Yes/No
4. Is the insecticide within its expiry date? Yes/No
5. Are the spray equipment for IRS certified by the DVBDCO? Yes/No
6. Is the route chart for IRS available at the PHC? Yes/No
7. Is the IEC plan for IRS available at the PHC? Yes/No
8. Are adequate funds available for spray wages? Yes/No
9. Is the IRS activity monitoring plan available at the PHC? Yes/No
10. Has the micro-action plan been executed as per plans till date? Yes/No

H. Reports

1. Have the M4-SC and M4-PHC of the completed fortnight been submitted? Verify.

Subcentre visit

Name of state: **Name of MTS:**
Name of district: **Date of visit:**
Name of subcentre:

1. Has the MPHW sent M4-SC of the last fortnight?
2. Number of RDKs used during the last month.
3. Number of RDTs found positive.
4. Number of slides collected during the last month.
5. Number of slides sent on the same day of collection for microscopy.
6. Number of slide reports received within 24 hours of slide collection.
7. Does the health worker have the M-1 of the previous fortnight of ASHAs within the subcentre area? Yes/No
8. Is two month stock of ACT/CQ/PQ/ACT/RDK available at the subcentre? Yes/No
9. Are any drugs/RDK at risk of expiry within six months? Yes/No
10. Are insecticides and RDKs being stored as per guidelines? Yes/No
11. Were bed nets distributed in the subcentre area in this year? Yes/No
12. If yes, check the records.
13. Number of bed nets distributed to the priority villages in the subcentre area.
14. Was verification of distribution of bed nets to beneficiaries undertaken by MPHW? Yes/No
15. If yes, number of beneficiaries verified by house visits.
16. Is record of community owned bed nets available village-wise? If yes, check records.
17. IRS activity. Check the VC-2 of the subcentre and verify during the village visit

Village visit

Name of state: **Name of MTS:**
Name of district: **Date of visit:**
Name of PHC: **Name of village:**

IRS activity (applicable in transmission season)

1. Was prior information given to the villagers about IRS round? Yes/No
2. Was the MPHW (M) present at the time of IRS activity for supervision? Yes/No

3. Was the route chart available with the spray squad? Yes/No
4. Rate of discharge of spray equipment.
5. Name of insecticide used.
6. Was the spray suspension stirred adequately? Yes/No
7. Was the spray performed as per guidelines? Yes/No
8. Were safety measures undertaken by the spray squad? Yes/No
9. Were empty containers disposed as per guidelines? Yes/No
10. Number of houses in the village and number of houses covered by spray.

ASHA/CHV visit

Name of state: **Name of MTS:**
Name of district: **Date of visit:**
Name of PHC: **Name of subcentre:**
Name of village: **Name of ASHA/CHV:**

1. Is the ASHA/CHV trained, especially for blood slide collection and use of RDT? When possible, see demonstration.
2. Number of RDKs used in the last completed month.
3. Number of RDTs found positive.
4. Number of slides collected in the last completed month.
5. Number of slides sent on the same day to the laboratory.
6. Number of slide reports received within 24 hours of slide collection.
7. Is the M-1 of ASHA/CHV being maintained and submitted on time? (Verify by seeing the M-1 of last fortnight)
8. Was the ASHA/CHV visited by the MPHW in the last one month and enquired about malaria cases?
9. Does the ASHA/CHV have two months stock of RDT and antimalarial drugs? Yes/No
10. Are there any RDKs and antimalarials at risk of expiry within six months? Yes/No
11. Are RDKs and antimalarials being stored as per guidelines? Yes/No

Patient visit

Date of visit: **Name of village:**

Patient visit (ASHA/CHV 1)

1. Name of the patient
2. Did the ASHA/CHV collect the blood slide of the patient? Yes/No
3. Did the ASHA/CHV perform RDT on the patient? Yes/No
4. Was treatment started within 24 hours of the slide collection/RDT? Yes/No
5. Did the ASHA/CHC tell about personal protection measures for prevention of malaria? Yes/No
6. Was any money charged by the ASHA/CHV for diagnosis or treatment? Yes/No

7. Was the patient given bed net? (if distributed in the village) Yes/No
8. Was the patient using the bed net? Yes/No
9. Was the bed net regularly being treated at regular intervals (only for ITNs and not LLINs)? Yes/No

Patient visit (ASHA/CHV 2)

1. Name of the patient
2. Did the ASHA/CHV collect the blood slide of the patient? Yes/No
3. Did the ASHA/CHV perform RDT on the patient? Yes/No
4. Was treatment started within 24 hours of the slide collection/RDT? Yes/No
5. Did the ASHA/CHC tell about personal protection measures for prevention of malaria? Yes/No
6. Was any money charged by the ASHA/CHV for diagnosis or treatment? Yes/No
7. Was the patient given bed net? (if distributed in the village) Yes/No
8. Was the patient using the bed net? Yes/No
9. Was the bed net regularly being treated at regular intervals (only for ITNs and not LLINs)? Yes/No

Summary of observations of MTS

Action taken by the supervisor

Follow-up on previous visit's suggestions

Action suggested

Dated: **Signature of MTS**

Annex 18

Secretary - Checklist for malaria programme review

1. Status of case detection indicators

- Annual blood examination rate (ABER), total malaria cases, Pf cases and deaths, compared to the same period of last year

2. Financial

- Have the SOEs of last quarter and UCs of last year been submitted to Directorate of NVBDCP by the state?
- Have the SOEs of last quarter and UCs of last year been submitted by the districts?
- Is the audit of the district and state society for the last financial year complete?
- Have funds been received from centre and other sources in time and are they adequate?
- Have funds been released to the districts on the basis of utilization and balances? Are adequate funds available with districts?

3. Logistics

- Have adequate logistics been received from centre and other sources?
- Have logistics been distributed to the districts on the basis of technical rationale?
- Is district-wise monitoring of logistic position being done?
- Are monthly logistics report being submitted by districts and state on time and being communicated to Directorate of NVBDCP regularly by 15th of following month?
- Have the consignee receipts been submitted to Directorate of NVBDCP for the items received up to the previous month?

4. Human resources / training

- Is adequately trained staff present against sanctioned posts?
- Has the existing staff been rationally deployed so that least vacancies exist in high-risk areas?
- Whether integration of LTs under different programmes for utilizing their services as multipurpose LTs, been done?

5. Programme implementation

- Has the state action plan for the next calendar year, been prepared by December and submitted to Directorate of NVBDCP?
- Has the state action plan been incorporated in the NRHM PIP?

- Were district action plans prepared and submitted by all districts by November?
- Have the districts completed preparation of district micro-plan before start of transmission season?
- Are the micro-plans based on GIS mapping?
- What is the training status of staff regarding IRS before start of transmission season?

6. Specific activity monitoring

- What is the status of GIS mapping?
- Has the village wise data for all districts been sent to the SPO?
- Are RDKs being provided to remote and inaccessible areas?
- Is the proforma on monitoring of RDKs being submitted to Directorate of NVBDCP regularly?
- Have ASHAs been trained on the use of RDTs? How many are yet to be trained?

7. IEC / BCC

- What are the specific BCC activities that have been undertaken in the last quarter?

8. Intersectoral coordination

- How many NGOs / CBOs / military and para-military hospitals are involved in the programme in various districts?
- Whether state transport corporation and other public transport are being used for transportation of blood slides and getting results?

District Collector / Zilla Parishad Chairperson:
Checklist for review of malaria

1. Status of case detection indicators

- ABER, total malaria Cases, Pf Cases, deaths; compared to the same period of last year

2. Financial

- Have the SOEs of the last quarter / UCs of the last year been submitted by the district to the state?
- Is the audit of the district society for the last financial year complete?
- Have funds been received from State society and other sources in a timely manner and are they adequate?

3. Logistics

- Have adequate logistics been received from centre and other sources?
- Have logistics been distributed to all implementation points (PHCs, SCs, ASHA) on the basis of technical rationale?
- Are monthly logistics report being submitted by the district on time?
- Have all the consignee receipts been submitted?

4. Human resources / training

- Is adequately trained staff present against sanctioned posts?
- Have the existing staff been rationally deployed so that least vacancies exist in high-risk areas?
- Are trained LTs present in all PHCs?
- Whether LTs are being used as multipurpose LTs at PHCs?

5. Programme implementation

- Has the district action plan been prepared by November and submitted by the district?
- Has the district completed preparation of district micro-plan for IRS before start of transmission season? Is the micro-plan based on GIS mapping?
- Are the spray squads been trained/ reoriented for IRS before commencement of spray?
- Have all the spray equipment been checked and certified?
- Have personnel been nominated for supervision of IRS, area-wise?

6. Specific activity monitoring

- What is the status of GIS mapping?
- Has the village wise data been sent to SPO?
- Are RDKs being provided to remote and inaccessible areas?
- Have ASHAs been trained on the use of RDTs? How many are yet to be trained?

7. IEC / BCC

- What are the specific BCC activities that have been undertaken in the last quarter?
- Is the community being given prior information regarding of spray rounds before the transmission season to improve acceptance of IRS? If yes, who is doing this?

8. Intersectoral coordination

- How many NGOs/ CBOs/ military & para-military hospitals are involved in the programme in the district? How many of these have been involved in the last quarter?
- Whether state transport corporation and other public transport are being used for transportation of blood slides and getting results?

Annex 19

List of malaria indicators for analysis at various levels

Indicators	Subcentre	PHC	District	State	National
Surveillance / case detection / case management					
Number of fever cases	+	+	+	+	+
Number of malaria cases	+	+	+	+	+
Number of *P. falciparum* cases	+	+	+	+	+
Number of deaths due to malaria	+	+	+	+	+
Number of RDTs received and used	+	+			
Number of RDTs planned versus received and used			+	+	
Number of ACT blister-packs received and used	+	+			
Number of ACT blister-packs planned versus received and used			+	+	
Percentage of PHCs, subcentres, ASHAs/CHWs reporting stock-out of antimalarials lasting more than 15 days during the quarter			+	+	+
Monthly blood examination rate (MBER)		+	+		
Annual blood examination rate (ABER)		+	+	+	+
Annual parasite incidence (API)		+	+	+	+
Annual *falciparum* incidence (AfI)		+	+	+	+
Test positivity rate (TPR)		+	+	+	+
Test *falciparum* rate (TfR)		+	+	+	+
P. falciparum percentage		+	+	+	+
Percentage of MPHWs/ASHAs/CHVs trained for RDT / ACT use		+	+	+	+
Percentage of diagnostic facilities functional with microscopy and RDT		+	+	+	+
Percentage of *P. falciparum* cases tested positive by microscopy/RDT and treatment started with ACT no later than the next day		+	+	+	+
Integrated vector management					
Number of ITNs/LLINs distributed	+	+	+	+	+
Number of bed nets treated	+				
Number of houses with at least two bed nets	+				
Percentage of eligible population covered by ITN/LLIN		+	+	+	+
Percentage of targeted population covered by ITN/LLIN		+	+	+	+
Percentage of eligible villages with > 80% population coverage with ITN/LLIN		+	+	+	+
Percentage of households in which people slept under		+	+	+	+

ITN/LLIN previous night					
Percentage of PHCs sampled in which utilization of ITN/LLIN was > 80%			+	+	+
Percentage of population covered with IRS	+				
Percentage of eligible population covered with IRS		+	+	+	+
Percentage of target population covered with IRS		+	+	+	+
Percentage of rooms covered with IRS	+	+	+	+	+
Insecticide use		+	+	+	+
Percentage of spray equipment in working condition			+	+	+
Percentage of spray workers trained			+	+	+
Others					
Outbreaks reported: Yes / NO	+	+	+	+	+
Number of BCC activities		+	+	+	+
Availability of full time DVBDCO			+	+	+
Availability of full time SPOs				+	+
Percentage of ASHAs, MPHWs, MTSs, LTs, DVBDCOs in position				+	+
Policy and strategy development					
Sites to monitor post-purchase quality of RDTs, drugs and insecticides					+
Therapeutic efficacy study completed in each site every second year					+
All endemic districts have malaria incidence segregated by age and gender					+

Annex 20

NATIONAL VECTOR BORNE DISEASE CONTROL PROGRAMME

District annual planning format – 1

Allocation of RDKs for a plan year based on epidemiological and operational data

Name of district: ……..

S. No	PHC	Subcentre/village with SfR > 1% and no microscopy result possible within 24 h	Total population of subcentres and villages in column 3	Number of blood examinations during last year (A)	Expected RDT requirements in subcentres and villages in column 3 (A x 1.25) = B	RDT buffer stock and for other areas = (B x 0.20) = C	Total RDT requirement = (B + C)	Villages and subcentre areas in column 3 prioritized for this year	Number of RDKs distributed in prioritized areas
1	2	3	4	5	6	7	8	9	10
	PHC 1	PHC Emergency							
		Subcentre 1							
		Village 1							
		Village 2							
		Total							
		Subcentre 2							
		Village 1							
		Village 2							
		Total							
	PHC 2								
	Total								

NATIONAL VECTOR BORNE DISEASE CONTROL PROGRAMME

District annual planning format – 2

IVM planning

District: …….. **Block …….**

Name of subcentre/village with high risk population	Subcentre and village code	Population	Population eligible for IRS/ITN/ LLIN	Population eligible for IRS	DDT requirement for eligible population	Malathion requirement for eligible population	SP requirement for eligible population	Population targeted for IRS	DDT requirement for targeted population	Malathion requirement for targeted population	Synthetic pyrethroid requirement for targeted population	Population eligible for bed nets	Total bed nets required (Column 13 ÷ 2.5)	Number of ITNs available with households	Number of LLINs with effective life available with households	Total bed nets, i.e. sum of Columns 15 and 16	Bed nets required in current year (Column 14 minus column 17	Number of ITNs required to be impregnated this year	Synthetic pyrethroid requirement for ITN impregnation	Number of LLINs planned to be distributed
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
Subcentr																				
Village 1																				
Village 2																				
Village 3																				
Village 4																				
Subcentr																				
Subcentr																				
Village 1																				
Village 2																				
Subcentr																				
PHC total																				

This form is prepared by DVBDCO and DVBDC consultant in coordination with BMOs. Selection of high-risk subcentres should be based on programme guidelines.

NATIONAL VECTOR BORNE DISEASE CONTROL PROGRAMME
Annual planning format – 3: Microplanning for IRS

1. Training programme for supervisors and spray squads

Category of staff	Total	Number of training sessions	Date(s)	Venue(s)
MPHWs and other supervisors				
Spray squads				

2. PHC Spray programme

Subcentre	Village	Date of spray	Squad number	Insecticide dumping site
Subcentre 1	Village 1			
	Village 2			
Subcentre 2	Village 1			
	Village n			

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Annex 21

NATIONAL VECTOR BORNE DISEASE CONTROL PROGRAMME

State annual action plan

Year: ……..

A. Population: ……..

B. Status of health facilities:

S. No	Name of health facility	Number of health facilities
1	District hospitals	
2	Block PHCs / CHCs	
3	Additional PHCs / Mini PHCs	
4	Subcentres	
5	Villages	
6	Rapid response teams	

C. Human resource

S. No	Staff	Sanctioned (A)	In place (B)	Trained as per guidelines (C)	Required to be trained (D = B-C)
1	DVBDCO (full time)				
2	DVBDC consultant				
3	AMO				
4	MO - Block PHC /CHC				
5	MO – PHC				
6	Other MOs				
7	LT				
8	LT (contractual)*				
9	Health supervisors (M)				
10	Health supervisors (F)				
11	MPHW (M)				
12	MPHW (M) (contractual)				
13	MPHW (F)				
14	MTS (contractual)*				
15	ASHA				
16	Others (project specific)*				

* GFATM supported project

Number of batches for training based on training needs (as per column D above)

D. District-wise epidemiological situation:

A brief analysis of parameters to assess performance (e.g. ABER) and impact (API, cases, deaths etc.) may be given in order to identify gaps and areas requiring improvement

D1. Data for development of district-wise action plans

Name of district	Year	Population	BSC/BSE	ABER	Total cases	Pf cases	API	SPR	SfR	Deaths due to malaria
District	201									
	201									
	201									
	201									
	201									
District	201									
	201									
	201									
	201									
	201									
District	201									
	201									
	201									
	201									
	201									
State	201									
	201									
	201									
	201									
	201									

D2. High-risk areas identified based on epidemiological data

S. No	District	Number of high-risk PHCs	Number of high-risk subcentres	Number of high-risk villages	High-risk population	Tribal population
1	District 1					
2	District 2					
	State total					

D3. Classification of areas as per API

S. No	API	Number of districts	Number of PHCs	Number of subcentres	Number of villages	Population in villages	% of population in villages
1	<1						
2	1-2						
3	2-5						
4	5-10						
5	>10						
	Total						

E. GIS mapping showing village-wise data entry of high endemic districts (based on epidemiological data for the year 2015) attached.

F. Outbreaks: Yes/No; if yes,

- Number of outbreaks
- Area(s) affected
- Period(s) of outbreak
- Number of cases and deaths reported during outbreak(s)
- Reasons for outbreak(s)
- Containment measures taken
- Were outbreak containment(s) submitted by State to centre? Yes/No

RDKs (for selected high-endemic districts only)

A. Number of RDKs for the plan year based on epidemiological and operational data

S. No	District	Number of PHCs where RDTs are to be used in emergency hours (A)	Number of subcentres with Pf > 30% and SfR > 1% and microscopy results not available within 24 h (B)	Number of blood examinations in those PHC (A) and subcentre (B) areas last years (C)	Estimated RDT requirement in remote high Pf areas and PHCs (C x 1.25) (D)	RDTs for buffer stock and distribution to other areas (D x 0.2) (E)	Total annual RDT requirement (D+E)	Number of RDTs to be distributed in prioritised areas
1								
2								
3								
4								
5								
	Total							

The number of RDT examinations is estimated by adding 25% to the number of examinations during the last completed calendar year, because availability of RDTs can attract additional patients.

Villages planned to be supplied with RDKs should have trained ASHA/AWW/CHV

B. Requirement of RDKs based on epidemiological data

S. No	Details	Slide collection	Number of subcentres	Number of villages	Total population	Tribal population
1	Areas with high Pf%					
2	Prioritized for RDK supply during the year					
3	Number of RDKs required for next plan year					

C. Area for ACT supply

Name of district	Population	Pf cases in previous year	ACT-SP (< 1 year)	ACT-SP (1-4 years)	ACT-SP (5-9 years)	ACT-SP (9-14 years)	ACT-SP (15 years & above)	ACT-AL (< 3 years)	ACT-AL (3-8 years)	ACT-AL (9-14 years)	ACT-AL (15 years & above)	Quinine tablets for pregnant
Total												

Planning for ACTs is based on number of Pf cases in previous year plus 25% for increasing patient load due to services attracting more patients and buffer quantity of another 25%. Therefore, the requirements are calculated by multiplying previous year's use by a factor, 1.5. Planning for Quinine for pregnant women is on the basis that 2% of all Pf cases occurring in pregnant women with 21 tablets of Quinine 650 mg required for each pregnant woman.

D. Bed nets

Bed nets planning is based on bed net survey and enumeration of bed nets available in households and requirement is based on 2 nets per household, taking average size of family as 5 members.

S. No	Name of district	Number of subcentres	Number of villages	Eligible population	Bed nets required	Bed nets available	Bed nets required	Bed nets planned to be distributed in the year
1								
2								
3								
4								
5								
	Total							

E. IRS

S. No	Name of district	Number of PHCs for IRS	Number of subcentres for IRS	Number of villages for IRS	Total population to be covered in IRS	Number of spray squads	Training of spray squads	Equipment of IRS*	DDT (MT)	Malathion (MT)	Synthetic pyrethroids (MT)
1											
2											
3											
4											
5											
	Total										

* Requirement of new spray equipment calculated taking into account the existing availability of functional equipment

F. Innovations

S. No	Innovations	Describe in detail	Funds allocated (Rs)
1	Patient referral, e.g. like use of NHM/RKS flexifund for transporting severe cases		
2	Transportation of slides, e.g. use of public transport system		
3	NGO/CBO involvement		
4	Community mobilization, e.g. street plays, puppet shows, self-help groups		

G. Commodity requirements

Name of item	Previous year's utilization	Current year's requirement (A)	Balance available (B)	Net requirement (A-B)
Tab. Chloroquine				
CQ + PQ Combiblister pack				
Tab. Primaquine 2.5 mg				
Tab. Primaquine 7.5 mg				
ACT-SP (for < 1 year)				
ACT-SP (for 1-4 years)				
ACT-SP (for 5-8 years)				
ACT-SP (for 9-14 years)				
ACT-SP (for 15 years & above)				
ACT-AL (for up to 3 years)				
ACT-AL (for > 3 to 8 years)				
ACT-AL (for 9-14 years)				
ACT-AL (for 15 years & above)				
Inj. Arteether				
Inj. Quinine				
Tab. Quinine sulphate				
Inj. Artesunate				
Inj. Artemether				
RDT kits: monovalent for Pf				
RDT kits: bivalent for Pf and Pv				
DDT 50% (in Kg)				
Malathion 25% wdp (Kg)				
Malathion technical (L)				
Temephos 50% (L)				
Cyphenothrin				
Diflubenzuron				
Pyriproxyfen				
Pyrethrum extract 2% (L)				
Pirimiphos methyl (L)				
SP for IRS wdp (Kg)				
SP for ITN treatment (L)				
ITN				
LLIN				
Microscopy slides				
Stirrup pumps				
Compression pumps				

H. Training (Mention the number of batches to be trained)

S. No	Trainees	Cost per batch (Rs)	Number trained in previous year	Batches to be trained in current year					Total cost (Rs)
				Q 1	Q 2	Q 3	Q 4	Total	
1	Medical specialists								
2	Medical officers								
3	LTs (induction)								
4	LTs (reorientation)								
5	MPHS (M)								
6	MPHS (F)								
7	MPHW (M)								
8	MPHW (F)								
9	ASHA								
10	CHVs other than ASHA								
11	Others (specify)								
	Total								

I. IEC/BCC (mention number against each activity)

S. No	Activities	Unit cost (Rs)	Previous year	Current year					
				Q 1 (No.)	Q 2 (No.)	Q 3 (No.)	Q 4 (No.)	Year total (No.)	Total cost (Rs)
A	**Print media**								
1	Posters								
2	Hoardings								
3	Newspaper advertisement								
B	**Electronic media**								
4	TV campaigns								
5	Radio campaigns								
C	**Community level**								
6	Health camps								
7	IRS awareness camps								
8	Others (specify)								
	Total								

J. PPP

S. No	Schemes	Previous year (No.)	Planned in current year (No.)	Cost
1	Scheme 1			
2	Scheme 2			
3	Scheme 3			
4	Scheme 4			
5	Scheme 5			
6	Scheme 6			
	Total			

K. Larvivorous fish

S. No	District	Hatcheries	Seasonal water bodies	Perennial water bodies	Water bodies released with fish in previous year (No.)	Water bodies planned to be released with fish in current year (No.)	Cost
1	District 1						
2	District 2						
3							
4							
5							
	Total						

L. Others: Specify planning for any other activity

M. SWOT analysis of the districts

	Current features	Actions to be taken
Strengths		
Weakness		
Opportunities		
Threats		

N. Urban malaria scheme

S. No	Name of State/UT	Number of hatcheries at district level	Number of hatcheries at block/PHC/village level	Number of water bodies seeded with fish

Month-wise epidemiological report for the year 20..

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Population												
No. of BSC/BSE												
Pv cases												
Pf cases												
Total malaria cases												
SPR												
SfR												
API												
ABER												
RT given												
Deaths												

Calculation of requirements of antimalarials

The norms for calculation of antimalarial drugs to avoid stock-outs even in circumstances like unforeseen outbreaks and procurement delays are as follows:

The data of positive malaria cases of the last completed year is taken as basis for calculation. 25% additional quantity is taken as buffer on the technical requirement. However, in view of cyclic trends of malaria outbreaks occurring, the possible requirements may be up to the maximum number of cases reported in any of the years during the decade. Therefore, this figure is also considered while calculating the requirements of antimalarial drugs, e.g. for calculating the requirements for the year 2016, the data of the year with maximum number of cases reported in the preceding decade, i.e. in 2006 are taken. This factor is also important particularly when under- reporting is known.

Chloroquine

The average requirement per patient is worked out as 6 tablets considering the different dosages for various age groups. However, up to 50% of suspected malaria cases in whom blood smear has been made may be treated with complete course of chloroquine due to delay in receiving microscopy results. On this premise,

$$\text{Number of chloroquine tablets required} = \text{No. of blood slides collected} \times 6 \times \frac{50}{100}$$

This amount is also expected to take care of confirmed P. vivax cases also. The chloroquine tablets used for treatment of clinical malaria is expected to be reduced to less than 25 % of blood slides collected or even less, after the use of bivalent RDTs (which can detect both P. vivax and P. falciparum) is expanded in the programme.

Primaquine (2.5 mg) tablets

Children (1 to 14 years) are estimated to constitute 40% of P. vivax cases. The average number of primaquine (2.5 mg) required per child is 4 tablets per day for 14 days. Therefore the requirement of primaquine (2.5 mg) tablets =
(Total number of P. vivax cases x 40% x 4 tablets x 14 days) with an additional 25% as buffer stocks.

Primaquine (7.5 mg) tablets

Primaquine (7.5 mg) tablets are required for the following:

(a) Adults constitute 60% of P. vivax cases and require 2 tablets of primaquine (7.5 mg) per case per day for 14 days. Therefore, the requirement =
(Number of P. vivax cases x 60% x 2 x 14) + 25% buffer.

(b) Adults constitute 60% of P. falciparum cases and require 45 mg primaquine (6 tablets of 7.5 mg) as a single dose. Therefore the requirement of primaquine (7.5 mg) tablets = (Number of P. falciparum cases x 60% x 6) + 25% buffer.

(c) Children constitute 40% of P. falciparum cases and require 30 mg primaquine at an average when different age groups of children are considered. Therefore, the requirement of Primaquine (7.5 mg) tablets =
(Number of P. falciparum case cases x 40% x 4) + 25% buffer.

The total requirement of primaquine (7.5 mg) tablets is the sum of requirements calculated in (a), (b) and (c) above.

Artemisinin based Combination Therapy (ACT)

ACT-SP is the combination of ACT which is approved for use under the NVBDCP.

ACT-SP packs for adults

It is estimated that 60% of P. falciparum cases are adults. One blister pack containing 3 tablets of Sulpha Pyrimethamine (SP) and 12 tablets of Artesunate (50 mg) is required for treatment of one adult case. The requirement of ACT-SP blister packs for treating P. falciparum cases = (Number of P. falciparum cases x 60%) + 25% buffer.

ACT-SP packs for children

It is estimated that 40% of malaria cases occur in the age group 14 years and below. The distribution among the paediatric cases is estimated to be as follows:

Under 1 year -10%
1 to 4 years -22%
5 to 8 years-30% and
9 to 14 years -38%

Therefore, the technical requirement of ACT-SP packs for children in each age group is as under:

Under 1 year = (Number of *Pf* cases x 0.4 x 0.10) + 25% buffer
1 to 4 years = (Number of *Pf* cases x 0.4 x 0.22) + 25% buffer
5 to 8 years = (Number of *Pf* cases x 0.4 x 0.30) + 25% buffer
9 to 14 years = (Number of *Pf* cases x 0.4 x 0.38) + 25% buffer

There are various malaria treatment providers/facilities at different levels, e.g. hospitals, CHCs, PHCs, subcentres, and trained ASHAs/AWWs/CHVs at village level. To ensure that no stock-outs of ACT-SP occur, deployment reserves are essential and the recommended norms at each level are:

- ASHA - 2 courses for each age group
- Subcentre - 3 courses for each paediatric age group and 6 courses for adults
- PHC -10 courses for each paediatric age group and 25 courses for adults
- CHC -15 courses for each paediatric age group and 50 courses for adults

At the district and state levels, stock for replenishing will be kept on the basis of total *Pf* cases expected to be treated in a year which will include ACT-SP packs for all age groups.

Similar calculations may be made for ACT-AL requirements by NE States based on the demographic distribution of the population.

Injectable artemisinin derivatives and quinine

Injectable artemisinin derivatives and quinine are required for treatment of severe malaria cases. The proportion of cases in adults and children is taken as 60% and 40% respectively. Artesunate/artemether/arteether and quinine injections may be calculated for an average requirement of 3 days per patient, by which time the patient is generally expected to be in a condition to take oral antimalarials and complete his treatment.

Annex 22

FINANCIAL MANAGEMENT

1. FORM No. GFR-19A (Utilization certificate)

(NAME OF SOCIETY)

1. Certified that out of Rs. ..……. (rupees ……) of grant in aid sanctioned during the year ……in favour of the (NAME OF SOCIETY) under the Ministry of Health and Family Welfare vide sanction numbers given hereunder and Rs……. on account of unspent balance of the previous year, and amount of Rs. ……. on account of miscellaneous receipts (including interest received on bank account) totalling to Rs ……. out of which an amount of Rs …… has been has been utilized for the purpose for which it was sanctioned and the balance of Rs. ……remaining unutilized at the end of the year has been surrendered to Government (vide D.D. No……..dated……..) will be adjusted towards the grants-in-aid payable during the next year.

2. Certified that the conditions on which the grant in aid was sanctioned have been fulfilled and that I have exercised the following checks to see that the money was actually utilized for the purpose of which it was sanctioned.

i. All expenditures incurred are in accordance with the rules and regulations of SVBDCS / and within the framework of the GOI guidelines.
ii. The expenditure incurred is related to the programme activities.
iii. The expenditure is incurred with the proper resolution of the Society.
iv. The expenditure incurred on the purchase of fixed assets or consumable goods has been verified from the relevant stock register.
v. No amount of the grant-in-aid or any receipt of the funds from other sources is deposited for gain or to generate income by way of interest other than bank interest.
vi. Funds have been released to the NGO after their proper scrutiny and verification and strictly in conformity with the NGO guidelines formulated by the Directorate of National Vector Disease Control Programme.

Member Secretary Chairperson

(Chartered Accountant) Seal

2. Important activities and schedule for external audit as per NHM

S. No	Activity	Date	Remarks
1.	GoI sending list of chartered accountant firms to States/UTS	31st December	
2.	States/UTs contacting the firms from the list sent by GoI	31st January	The firms will be contacted by sending request for proposal, (letter of invitation) and TOR by registered post with acknowledgement due. It should be made clear in the letter of invitation that technical bids will be accepted only in a sealed envelope. It should be made clear that only the firm found most suitable in evaluation of technical bid will be awarded the audit work. The date for opening the technical bid will be mentioned. It will also be mentioned that the bid will be opened in the presence of representatives of willing chartered accountant firms who have applied.
3	Last date for accepting technical bids	28th/29th February	
4	Date for opening technical bids	28th/29th February	Give standard evaluation form with criteria for evaluation within 7 days of accepting bids. Technical bids should be evaluated by a committee appointed by the executive body of the SHS/DHS as per standard evaluation.
5	Date for intimating the selected auditor	Within next 15 working days after opening technical bids	
6	Last date for appointing the auditor	31st March	The appointment letter will clearly mention the date on which the SHS/DHS accounts will be made available to the auditor
7	Completion and finalization of accounts of all DHSs	30th April	If the accounts of the SHS/DHS are not made available to the auditor by due date, the auditor will be free to inform the GoI about the delay

8	Completion of audit of DHSs	31st May	
9	Consolidation of accounts of all DHSs with SHS accounts	15th June	
10	Completion of audit of SHS	30th June	
11	Submission of audit report to MoH&FW along with management letter and society's comments on the report and UCs	31st July	Audit report to be co-signed by the mission director/SPO/State finance manager and the auditor

Annex 23

Logistics and supply chain management

1. Checklist for receiving drugs/commodities

Name of drugs/commodities (unit/dosage/strength):

Name of supplier with address:

S. No	Particulars	Yes	No	Remarks
1	Check invoice/PO, contract number, goods' description, quantity, unit price, and total amount and any other information furnished by the supplier and transporter			
2	Invoice signed and stamped with company stamp/seal in original			
3	Copy of consignment note from transporter			
4	Copy of road permits/octroi exemption certificate, if any. LR/RR submitted			
5	Copy of acknowledgement of receipt of goods to be received and signed by consignees, i.e. GRAN/consignee receipt/consignee acceptance certificate			
6	Copy of packing list identifying contents of each package			
7	Copy of manufacturer's or supplier's warranty certificate covering all items, if any			
8	Copy of certificate of inspection (pre-dispatch inspection) furnished to supplier by the nominated inspection agency, i.e. inspection and dispatch clearance certificate and internal analysis report of drugs by manufacturers, if any			
9	Copy of NOA/contract with technical specification			
10	Certificate of country origin, copy of insurance certificate			
11	NVBDCP supply, not for sale marked, date of expiry and other instructions visible			
12	If found broken/damaged/any discrepancy, give specific remarks and do not accept it and inform it to the supplier and make proper documentation			
13	Any other procurement specific documents required for delivery/payment purposes			

Name:
Designation:
Signature of verifying authority with stamp

2. Checklist for physical verification

Name of drugs/commodities (unit/dosage/strength):
Date of physical verification:

S. No	Particulars	Yes	No	Remarks
1	After opening the package/box/carton, if any damage/shortage is noted, record it and inform the supplier and NVBDCP			
2	Is there any short expiry/damaged items; and if yes, segregate, record and report to supplier and NVBDCP			
3	Physically count the quantity (packs/vials as per invoice), specification adhered to, any discrepancy noted and record it and inform the supplier and NVBDCP			
4	Batch number, expiry date, packing and storage conditions as per NOA/contract/technical specifications			
5	After storing items entered in stock ledger; also make entry in ledger for any expired items, any drugs transferred, any adjustments, and any drugs received from other health facilities			

Issue Final Acceptance Certificate (FAC) only after completing the physical verification of goods received and before one month of receipt
Do physical count/verification of all the stocks at least once every six months

Name:
Designation:
Signature of verifying authority with stamp

3. Statement on stock of drugs and commodities

(Items relevant to the malaria programme are only mentioned in table below)

Name of State/UT **Date:**

S. No	Name of item	Opening balance	Quantity received	Total (3 + 4)	Quantity consumed	Quantity life expired	Quantity diverted (if any)	Balance {6-(7+8+9)}	Current requirement	Net requirement (10-9)
1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**
1	Tab. Chloroquine									
2	CQ + PQ combi-pack									
3	Tab. Primaquine 2.5 mg									
4	Tab. Primaquine 7.5 mg									
5	ACT-SP (for < 1 year)									
6	ACT-SP (for 1-4 years)									
7	ACT-SP (for 5-8 years)									
8	ACT-SP (for 9-14 years)									
9	ACT-SP (for 15 years & above)									
10	ACT-AL (5 months to 3 years)									
11	ACT-AL(≥ 3 years to 8 years)									
12	ACT-AL (≥ 9 years to 14 years)									
13	ACT-AL (> 14 years)									
14	Inj. Arteether									
15	Inj. Quinine									
16	Tab. Quinine sulphate									
17	Inj. Artesunate									
18	Inj. Artemether									
19	RDT kits: monovalent for Pf									
20	RDT kits: bivalent for Pf and Pv									
21	DDT 50% (in Kg)									
22	Malathion 25% wdp (Kg)									
23	Malathion technical (L)									
24	Temephos 50% (L)									
25	Cyphenothrin									

S. No	Name of item	Opening balance	Quantity received	Total (3 + 4)	Quantity consumed	Quantity life expired	Quantity diverted (if any)	Balance {6-(7+8+9)}	Current requirement	Net requirement (10-9)
1	2	3	4	5	6	7	8	9	10	11
26	Diflubenzuron									
27	Pyriproxyfen									
28	Pyrethrum extract 2% (L)									
29	Pirimiphos methyl (L)									
30	SP for IRS wdp (Kg)									
31	SP for ITN treatment (L)									
32	ITN									
33	LLIN									
34	Microscopy slides									
35	Stirrup pumps									
36	Compression pumps									

Name:
Designation:
Signature of verifying authority with stamp

4. Format for Goods Receipt and Acceptance Note (GRAN)

GRAN No. ……...
Date: …….

To,
Name and address of procurement agency, if any or to NVBDCP

Goods Receipt and Acceptance Note (GRAN)/Acknowledgement of receipt of goods (For part payment as per contract)

This is to certify that the goods as detailed below have been received in good condition in accordance with the conditions of the contract and amended, if any

1. Project name :
2. Purchaser :
3. Contract number and date :
4. Name of the items supplied :
5. Name of the supplier/manufacturer :
6. Number of units supplied :
7. Schedule number / Lot number, if any :
8. Invoice number and date :
9. Details of batch number :
   Manufacturing date :
   Expiry date :
   (that comply with NOA/contract)
10. Date of delivery at consignee destination site :
11. Date of receipt at consignee destination :
12. Outstanding/dues with supplier as per NOA & discrepancy, if any:

Name:
Designation:
Signature of verifying authority with
Stamp (consignee)

CC to:
1. Director, NVBDCP, 22 Sham Nath Marg, Delhi-110054
2. Supplier/manufacturer

5. Final acceptance certificate (FAC)
(For final payment as per contract)

(To be issued on letterhead in duplicate – one for supplier and one for purchaser)

Description of goods supplied:
NOA number and date
Quantity supplied with adjustment for short supply, if any
Name of purchaser (e.g. NVBDCP, MoH&FW, GoI)
Name of supplier/manufacturer
Consignee (Name, address, telephone and Fax No.)
Date of final acceptance
Stock entry number and date

Certificate

We do hereby confirm having received ……. (Name of goods) in good condition on (date) ……. In accordance with the contract and entered in the stock ledger at page number …….. dated ……

Name:
Designation:
Signature of verifying authority with stamp

6. Guidelines for storage of drugs and commodities

The main purpose of storage is to protect the quality of products and its packaging throughout the supply chain and make products available for distribution. The guidelines for storage of drugs and commodities are mentioned below in brief.

- Clean and disinfect the store room regularly and monitor the storage conditions.
- Clean receiving, storage and packing areas and remove the garbage and also keep the stores away from rodents, insects and termites.
- Safely handle stores while loading and unloading from the vehicle.
- Clean bins, shelves and cupboards and store supplies in dry, well-lit and well-ventilated store rooms, away from direct sunlight.
- Ensure adequate ventilation and temperature control.
- Provide storage racks in such a way so that gangways are created for easy movement of materials and personnel handling the store.
- Stack cartons in steel racks/slotted angles and at least 10 cm (4 inch) off the floor, 30 cm (1 foot) away from walls and other stacks and no more than 2.5 m (8 feet) high.
- Store supplies in a manner that is accessible for FEFO, counting, and general management.
- Use FEFO principle and also issue drugs and commodities nearing expiry first.
- Store medical supplies separately, away from insecticides, chemicals, old files, office supplies, and other materials.
- Arrange cartons so that arrows point up, and ensure that identification labels, expiry dates, and manufacturing dates are visible.
- Monitor store security and safety to avoid theft/pilferage.
- Secure store room from water entry and from any seepages in walls, roof, doors and windows, especially during rainy season.
- Monitor commodity quality by visual inspection, checking expiry dates and also do physical verification of quantities.
- Ensure that the fire safety equipment (including fire extinguisher) is available and accessible and that personnel are trained to use it.
- Ensure fire-proof electrical fittings and appliances to prevent fire due to short-circuit and keep stocks away from electrical sockets.
- Separate damaged and expired stocks from usable stocks, by moving them to a secure area and disposal without delay as per the established procedure.
- Monitor stock levels, stock quantities and safety stocks and update stock ledger/records which are kept in safe custody.

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DIRECTORATE GENERAL OF HEALTH SERVICES
MINISTRY OF HEALTH AND FAMILY WELFARE
GOVERNMENT OF INDIA