COUNTRY
MONITORING & EVALUATION FRAMEWORK
IN
MALARIA CONTROL
(NVBDCP)

Government of India

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CHAPTER 1.

INTRODUCTION

Ever since the inception of Anti-malaria programme in 1953, the programme has regularly collected epidemiological data and compiled indicators, which have been the basis of impact assessment and future planning. The programme has over the years adapted to the ever changing needs on Monitoring & Evaluation, which today is one of the most important aspect of programme implementation and management. The concept of programme monitoring has now evolved from mere monitoring of impact and disease burden to close follow up of processes, outputs and outcomes.

Traditionally the programme has compiled epidemiological data through a system of sixteen manual reporting formats which are exhaustive in reporting. In the past few years the anti-malaria programme has undergone significant policy changes. Newer diagnostics like Rapid Diagnostics Tests (RDTs) have been introduced, at the peripheral level and Bed-nets have been distributed which will be scaled up rapidly in the coming years. In view of this, mechanisms to generate accountability for these expensive resources have to be developed. Until now MPWs were involved in active case detection by house to house visit. Over the years shortage of these MPWs has lead to poor surveillance activity in the programme. The integration with NRHM and induction of Accredited Social Health Activist (ASHA), as the first point of contact with the health care delivery, has called for further modification of reporting requirements.

There is a need for strengthening the monitoring of Programme management in NVBDCP. Programme monitoring enables continuous follow up of processes and outputs to identify problems at local level and help decision making where it is most needed. New cadre of M&E staff in the form of Malaria Technical Supervisor (MTS) is being appointed at sub-district level. It becomes imperative to utilize these personnel not only in routine monitoring of activities but also in assessment of quality of service delivery and for obtaining reliable data on programme management to assist in programme planning. The NVBDCP envisages to implement Lot Quality Assurance Survey (LQAS) based system of annual/ biannual/ quarterly surveys to obtain quality data on availability of diagnosis & treatment within 24 hours, on utilization of bed-nets and quality of IRS coverage and reasons for non-acceptance. This data will be reported through Programme Management Monitoring Reports (PMMRs) which will also report trainings, field visits, logistics etc.

A system also needs to be developed to continuously report inpatients with severe malaria and deaths on account of malaria. For the purpose a network of sentinel sites is required to provide data on trends of severe malaria and deaths due to malaria. NVBDCP now foresees establishing 1-2 sentinel sites in each high endemic district being covered under World Bank Project to begin with, for effective system of computerized data entry for speedy transmission and analysis of this data.

As cash grant is being released to states for various activities, which necessitates stringent monitoring of finances in the programme. This component is being strengthened for more effective use of resources.

In-depth reviews are conducted by involving various institutions and agencies which have contributed to assessment of programme implementation as well as its impact. It is now planned to conduct surveys at more regular intervals to obtain information on utilization of services by beneficiaries and behavioral aspects related to malaria, prevention and control for formulating area-specific control strategies..

The scope of this document is therefore to provide an integrated Plan for Monitoring & Evaluation of Anti-malaria activities under NVBDCP. The entire country will have a common approach to M&E as outlined in this document.

1.2 Terminology

1.2.1 Indicators

Indicators are specific, well-defined parameters, to represent some aspect of the disease or the program. As described later, indicators typically describe inputs, processes, outputs, outcomes or impact of the program in a manner that makes comparisons possible over time or between two or more groups. They help define and measure distinct elements of the program. Eg. Annual Parasite Incidence (API) is an indicator of disease burden and programme impact.

1.2.1 Surveillance

Surveillance has been defined as continous scrunity of the factors that determine the occurance and distribution of disease. Surveillance is essential for effective control and prevention, and includes the collection, analysis, interpretation and dissemination of relevant information for action. In the programme Active Surveillance is carried out by Multi Purpose Worker through domiciliary visit while passive surveillance is carried out by the facilities like ASHAs, Subcentres, PHCs, Malaria Clinics etc where the patient come for diagnosis and treatment.

Not all aspects of the disease can be captured in through a case-management-based system alone. Related indicators, such as drug resistance in malarial parasites and insecticide resistance in vectors is tracked in a few carefully chosen sites spread across the country, called *sentinel surveillance* sites. Similarly, a few carefully chosen hospitals will serve as sentinel sites for tracking incidence and outcomes of severe malaria.

1.2.3 Monitoring

Monitoring encompasses on-going follow-up of the planned program activities / processes to examine whether the program is being implemented as planned and whether it is on track to reach stated goals. Planning, implementation and monitoring can be thought of as a sequence of cyclical processes, where monitoring provides the information and feedback needed to plan corrective action as and where necessary.

1.2.4 Evaluation

Evaluation tells the program whether it has achieved stated goals in defined time-periods, and why it may have succeeded or failed. Evaluations are expected to lead to modification of Program Design and Policies. The performance of the program is

evaluated by independently conducted periodic surveys and qualitative assessments which provide measurements of a set of predetermined indicators. These include indicators like proportaion of cases receiving timely case management, the correct use of bed nets and indoor residual spray, the incidence of severe malaria and malaria mortality.

1.2.2 Planning

Planning means the rational use of relevant epidemiological data to make the most effective possible utilization of program resources, based on the best understanding of cause-effect relationships, leading to the achievement of program goals. Planning is a necessary element of program management.

In the malaria program, routine planning is an annual feature at block, district and higher levels, usually undertaken by core malaria program staff. Typically, surveillance and other program monitoring data is used to plan for insecticide spray, identification of areas for distribution of bednets, in planning for outbreak preparedness and planning for supplies & trainings related to case detection and management.

1.3 Types of indicators used for surveillance, monitoring and evaluation

1.3.1 Input Indicator

Input indicators tell us what the program is investing. Besides financial resources, the timely procurement of equipment and supplies, recruitments of staff and training provided to all functionaries are program inputs. Input indicators include, for instance, the achievement of targets for numbers of health workers or volunteers trained, achievement of procurement targets for specified supplies, etc.

1.3.2 Process Indicator

Process indicators tell us whether specified program activities are happening as planned, in quantity and quality. Quality of training or the quality of supplies provided are processes that are often measured. Similarly, review and planning meetings held, plans made, supervisory visits made, contracts awarded, are all processes. The quality control of data is itself a process, and whether specified data quality assurance processes have been established is an indicator of the process.

1.3.3 Output Indicator

Output indictors tell us what the immediate results of the inputs and processes were. Typically, what health workers do are outputs, which have come about as a result of many inputs and processes. The distribution of bed nets, the detection of fever cases, the achievement of insecticide spray targets are all outputs.

1.4.4 Outcome Indicator

Outcome indicators tell us whether the program interventions are having desired effects. Timely case management, the correct use of bed nets, reduction in vector density are all outcomes. These can be thought of as indicators of the status of the immediate causes

of disease. From the best available current knowledge of the disease, one would predict that, if these indicators improved, disease burden should decrease.

1.5.5 Impact Indicator

Impact indicators tell us whether we have reached. In the context of malaria, these are indicators of the burden of disease: the incidence of malaria, the incidence of severe malaria and the death rates from malaria.

The categorization of a given indicator as input or process or output is often subjective and a matter of convenience. This categorization should not be considered rigid, but should be utilized as a convenient framework to facilitate communication and planning within the program.

CHAPTER 2.

DEFINITIONS

Definitions in malaria control are to be applied to diseases management as well as selection criteria of Target Population for Vector control. Standard case definitions are required to bring about uniformity in management of cases as well as their reporting, which enables comparability within the same reporting unit over a period of time and across different reporting units. These case definitions are to be used at all levels in the programme.

2.1 Case Definitions

Table 1 provides case definitions for use in conjunction with indicators related to case detection and management.

Table 1: Case definitions used in NVBDCP

	Terms	Definitions
1	**Suspected Malaria**	A patient with fever in endemic area during transmission season, or who has recently visited an endemic area, without any other obvious cause of fever like: 1. Cough and other signs of respiratory infection 2. Running nose and other signs of cold 3. Diarrhoea 4. Pelvic inflammation indicated by severe low back ache, with or without vaginal discharge and urinary symptoms 5. Skin rash suggestive of eruptive illness 6. Burning micturition 7. Skin infections e.g. boils, abscess, infected wounds 8. Painful swelling of joints 9. Ear discharge **However, none of these symptoms exclude malaria with certainty. Only an experienced health functionary can exclude other "obvious causes of fever".**
2	**Clinical Malaria**	A patient with fever in endemic area during transmission season, or who has recently visited an endemic area, without any other obvious cause of fever will be considered as a case of clinical malaria if diagnosis cannot be established within 24 hours and treated accordingly. For ruling out other causes of fever, the following should be looked for. 1. Cough and other signs of respiratory infection 2. Running nose and other signs of cold 3. Diarrhoea

	Terms	Definitions
		4. Pelvic inflammation indicated by severe low back ache, with or without vaginal discharge and urinary symptoms 5. Skin rash suggestive of eruptive illness 6. Burning micturition 7. Skin infections e.g. boils, abscess, infected wounds 8. Painful swelling of joints 9. Ear discharge **However, none of these symptoms exclude malaria with certainty. Only an experienced health functionary can exclude other "obvious causes of fever".**
3	**Uncomplicated malaria (confirmed)**	A patient with fever without any other obvious cause and diagnosis confirmed by microscopy showing asexual malaria parasites in the blood and/or positive rapid diagnostic test (RDT). These cases are recorded as either *Pf* or *Pv*; a case of mixed infection is recorded as *Pf*.
4	**Severe malaria**	A patient, who requires hospitalization for symptoms and/or signs of severe malaria with laboratory confirmation of diagnosis. Severe malaria is clinically characterized by confusion or drowsiness with extreme weakness (prostration). In addition, the following may develop: cerebral malaria; generalized convulsions; pulmonary oedema; severe anaemia; renal failure; hypoglycaemia; metabolic acidosis; circulatory collapse/ shock; spontaneous bleeding; laboratory evidence of DIC; macroscopic haemoglobinuria; hyperthermia; hyperparasitaemia.
5	**Malaria Death**	Death of a patient with severe malaria, defined according to the above criteria. A death can only be medically certified as due to malaria if blood smear and/or RDT have been positive for *P.falciparum*.

Notes:
1. As per the revised Drug Policy (2008) all fever cases suspected for malaria should be investigated by microscopy or RDT. Therefore all efforts should be made to diagnose a suspected case. With the availability of RDTs in remote areas it is possible to confirm diagnosis in the remotest area. Only in exceptional circumstances where diagnosis by microscopy or RDK is not possible, cases with fever without any other obvious cause should be considered as 'clinical malaria' and treated.

*2. Recent literature points to the possibility of severe malaria in patients with Plasmodium vivax. Although this is very rare, it should be recognized, so cases with only P.vivax may also be recorded as severe, **if they fulfill the clinical criteria**.*

3. If the slide is positive for P.vivax only, death can only be certified as due to malaria by a tertiary level or higher facility, and a case report must be submitted to the State VBDCP for detailed death investigation.

2.2 Integrated Vector Control

As per the modified Plan of Operation (MPO) areas recording more than 2 API taking Sub-centre as unit are eligible for Indoor Residual Spray with appropriate insecticide. The Expert Committee (1995) further devised high risk criteria taking village as unit for identification of areas to be sprayed. However, for judicious use of resources and focussed intervention the Technical Advisory Committee (2002) on Malaria has rationalized the criteria for selection of villages for undertaking indoor residual spraying as indicated in the table below.

At present Indoor Residual Spray (IRS) and Bed-nets (ITNs/ LLINs) are the two key vector control interventions used in malaria control. Programme experience, drawn from years of operational problems encountered, has taught that IRS is a cost as well as labour intensive activity. In-depth review conducted by NIMR in the year 2006 also indicates the low coverage rates of IRS. Studies conducted across the globe in malaria endemic regions have shown that the average annual cost of bed-nets is much less than the cost of IRS; however, the use of bed nets requires continuous measures to improve community utilization. The NVBDCP has therefore taken the conscious decision to use either IRS or Bed-nets in a given area which means areas chosen for one method will usually not be covered by the second method of vector control. Therefore the criteria for selection of Target Populations for either method are laid in Table 2.

Table 2: Selection criteria for Target Population for Vector Control

	Vector Control Method	**Target Population**
1	**IRS**	**Areas with API more than 2 are classified as high risk.** The Technical Advisory Committee on Malaria in its meeting held on 30.05.2002 has rationalized the criteria for undertaking indoor residual spraying. These criteria are as follows: • To spray on priority basis all areas taking village/ sub-centre as a unit, with more than 5 API with suitable insecticides where ABER is 10% or more. • To spray on priority basis with suitable insecticide all areas reporting more than 5% SPR (based on passive collection of blood slides), if the ABER is below 10% • Due priority be accorded for spray if Pf proportion is more than 50%. • To accord priority for IRS in areas with less than API 5 / SPR 5% in case of drug resistant foci, project areas with population migration and aggregation or other vulnerable factors including peri-cantonment area.

	Vector Control Method	Target Population
		• To make provision for insecticidal spraying in epidemic situations. • Rotation of insecticides may be done so as to prolong their effectiveness. • Other parameters including entomological, ecological parameters etc., may also be considered while prioritizing areas for spraying. The population must be defined in terms of its size, as well as the no of households. It should be estimated annually **village wise**. It should also be mapped at the beginning of each year.
2	**Bed-nets (ITNs/ LLINs)**	The High risk area requiring vector intervention and 1. difficult for conducting spray operations and supervision of spray activities (remote, inaccessible areas, hilly terrain, forested area etc.) Or 2. areas where bednet usage and acceptability is high, would be covered with ITNs/ LLINs. The unit of area for coverage will be village.

CHAPTER 3.

MONITORING & EVALUATION SYSTEM

The system for monitoring and evaluation of malaria in the country comprises of

1. Routine Management Information System (HMIS)
2. Sentinel Surveillance of severe cases and deaths
3. House and Health Facility Survey
4. Central Evaluation
5. Supportive Supervision

The above components provide data on case management, Vector control, programme management, coverage and utilization of services. In addition very specific monitoring for Pf Resistance, Entomological aspects and Quality assurance are carried out. These are however, specialized issues and are beyond the scope of this document.

3.1 Routine Management Information System (HMIS)

The routine Management Information System (HMIS) is a series of recording and reporting formats to be maintained and transmitted by different tiers of the health care delivery system. The records and reports are to be maintained in such a way that high quality reliable data is generated from them. This data is the treasure house of information from which a series of indicators are derived at different levels.

3.1.1 Recording and Reporting

Integration of all Public Health Programmes and concerted service delivery under the umbrella of NRHM along with changing data and information needs of NVBDCP have prompted the revision and simplification of the HMIS. New interventions like RDTs, ACT, ITNs which have been recently introduced, are expensive inputs into the programme and it becomes important to closely monitor their utilization. Reporting on training activities, field visits, logistics & LQAS are to be done as part of Programme management Monitoring. For the purpose of routine recording and reporting the following M1 to M4 Formats and VC1 to VC 12 Formats and Programme Management Monitoring Report are used.

1. Case Detection and Management
   - M1 : Fortnightly Report of Fever Cases by ASHA/ MPW/ Health facility
   - M2 : Laboratory Request for Slide Examination
   - M3 : Record of slide Examination in PHC Laboratory
   - M4: Fortnightly Report of Cases From Subcentre/ PHC/ District/ State

2. Integrated vector Control
   - VC1: Primary record of IRS
   - VC1S: Wall Stencil
   - VC2: District IRS output Form
   - VC3: Primary record of bednet delivery and impregnation
   - VC 4: Bednet Delivery and Impregnation form

- VC 5: District Annual Stock report on vector control supplies
- VC-6. IVM Plan - Block level

3. Programme management Monitoring Report

An overview of these records and reports is provided below:

3.1.1.1 Case Detection and Management

Forms M1, M2 M3 and M4 of the HMIS are concerned with case-management data and are given in **Annexure1-4.**

1. Fortnightly Surveillance Report of Fever Cases by ASHA/ MPW/ Health facility (M1)

This is the primary case record for all suspected malaria cases i.e it is actually a line list of all fever cases. This form is to be filled by any health facility/ worker which are directly involved in case detection and treatment. Therefore an ASHA or any other Community Volunteer, MPW and MO would maintain case record in this format. In M1, each row corresponds with one patient record. Serial No is filled in column 1 which is started fresh each month.

- Details of village, village code, name of fever case and Head of Family are entered in Col 2 to 5. Each village and provider will be assigned a code which is to be retained once and for all. In exceptional cases where a fever case is a visitor to the village, 991/ 992 is filled in the respective Col.
- Whether collection is through Active / Passive case detection is filled as A or P in Col 6. For all purposes the ASHA/ CHV/ MO PHC will be passive agencies. Therefore in these cases the entry in Col 6 will be always P. It is only an MPW who can be involved in both types of collections. Fever cases coming to the MPW on their own will be entered as P while fever cases detected actively will be entered as A.
- Age is entered in Years/ months. Sex is to be entered as M for Male or F for Female. Duration of fever, date of RDT/ BSC, Slide No, sending and receipt of slides, result of examination of slides and RDTs, date of start of treatment, Nos of Tablets, referral and deaths if any are to be sequentially entered in the form.
- If the RDT is positive, the blood slide need not be sent for examination and therefore Col 14 to 18 are to be skipped and are simply slashed (/).Treatment in such cases is started immediately for Pf.
- In cases where RDT is negative blood slide is sent for examination. The result of RDT or slide should be entered by ASHA/ Health Worker/ MO in column 13, 17 & 18 of M1. Any positive test result is to be marked in red with a tick (√).
- Slide No is started fresh at the beginning of each year and continued over the subsequent months. In areas where RDTs are not supplied and RDTs have not been done column 13 is simply marked with a cross (X).
- In case of Blood slide the date of dispatch of slide and receipt of result are entered in column 15 and16. This will indicate the time lapse between the date of slide collection and receipt of results. During supervisory visits the time lag between slide collection or RDT and initiation of treatment should be identified.
- Col 18 denotes whether a women in reproductive age group is pregnant. If the answer is in affirmative it is to be marked with a tick (√).

- Depending upon the species, ASHA/ Health worker/ MO will decide the anti-malarials to be administered. The date of starting treatment will be entered in column 20. Suppose ACT has been selected then Number of Tablets/ blisters will be entered in column 21 while in columns 22 to 27 a cross (X) is put.
- Mark a tick (√) in column 28, if severe malaria is suspected. In column 29, date of referral of pregnant women suffering from malaria or severe malaria cases is entered. Date of deaths is entered in column 30.
- The lower part of the form consists of record of logistics. Opening balance at the beginning of the month, stock received, utilization and closing balance should be entered by ASHA or other service providers after physical verification of stocks.
- The ASHA/ CHV will fill M1 in duplicate and at the end of the fortnight, after allowing for 7 days for completion of patient records of the last few days of the reporting fortnight will forward the form to the Subcentre.
- In the middle of M1, the MPW will enter the summary of cases.
- The MPW will compile M4-SC by compiling the M1 of all ASHAs and adding his/ her own M1.

2. Laboratory Request Form for Slide Examination (M2)

Fever cases are diagnosed using RDT and/ or Blood Slide. In areas where RDTs are supplied, RDT and Blood slide are done at the same time. However, only if the RDT is negative, the blood slide is forwarded to Lab for further examination. Areas where RDTs are not supplied also rely on microscopy for diagnosis. M2 ie the Laboratory Request Form for Slide Examiantion, is filled in duplicate by ASHA/ CHV/ MPW whenever blood slides need to be sent to the Lab. In this form Col 1 to 7 are filled from M1 by ASHA/ CHV/ MPW. It is to be sent to PHC lab whenever required. Eg if 2 slides collected by an ASHA in a day, need to be examined, they are entered into M2 and sent to PHC Lab. The result of microscopy and feed back on smear quality are filled by the LT. All efforts should be made by LT to examine the slides on the day of receipt or the following day and send the results back to ASHA/ CHV/ MPW on the same day as examination of blood slides. The results obtained are entered into M1 by ASHA/ CHV/ MPW.

3. Record of slide Examination in PHC Laboratory (M3)

M3 is the Subcentre wise record, of slides examined in the PHC Lab. Slides reach the lab from the ASHA/ CHV/ MPW of the SC area. Slides will also be collected and examined for suspected malaria cases referred from the PHC OPD. Therefore at the beginning of each year, the M3 register is divided into sections for different subcentres as well as PHC OPD. In each subcentre section Serial Nos are started fresh at the beginning of each year. Record of slides sent along with M2 is entered serially into M3. As soon as M2 is received Col 3 to 10 are entered from M2 followed by the date of receipt. The date on which the slides are examined is entered in Col 2. The slide results are entered in Col 12, 13. The remarks column can indicate the quality of smear and other information like reasons of delay in examination.

2. **Fortnightly Report of Cases (M4)** is a village-wise/ provider-wise / subcentre wise fortnightly consolidation of all M1 forms belonging to a subcenter/ PHC area. The M1 is received by the MPW from ASHAs/ CHVs after 7 days of completion of the reporting fortnight. The MPW then compiles all M1s of his subcentre area into M4.

During compilation the Subcentre MPW will fill out aggregates of each health care provider in Subcentre area in one row and in the last row enter the compilation of his own M1. The report is made in triplicate and 2 copies are forwarded to PHC on the 25th of the month for the 1st fortnight and 10th of the following month for the 2nd fortnight. The PHC does a Subcentre wise compilation in a similar M4 format and in the penultimate row enters the consolidation of PHC M1. The PHC forwards its M4 along with one copy of M4s submitted by Subcentres on the 28th of the month for the 1st fortnight and 13th of the following month for the 2nd fortnight, to the district. The district further compiles this data and sends a PHC wise report to the state on the 30th of the month for the 1st fortnight and 15th of the following month for the 2nd fortnight. The state will send the compiled report to the Centre on the 5th of the following month and 20th of the following month for the 2nd fortnights. The district is required to enter Subcentre wise data from M4 of PHCs into NAMMIS as soon as the reports are received to avoid delay in transmission of reports.

3.1.1.2 Integrated Vector Control

The Vector Control Formats (**Annexure 5-11**) are to be utilized for the purpose of reporting of Vector Control activities undertaken during the transmission season.

1. **Primary Record of IRS (VC 1)**

   This record is to be maintained by the Spray supervisor/ Superior Field Worker (SFW) and is a house wise record of spray activity undertaken in the village. One such record is maintained for each Village in each round. VC 1 is submitted to MPW within one week of completion of the respective IRS round as per schedule. The details on village name, village code, date of spray, Round, Spray squad No, Spray supervisor are to be entered in the left upper corner of the format. Similarly summary of the coverage is given in the right upper corner of the format. The lower part consists of the house wise log of room coverage. As soon as IRS is completed in the village VC1 format is submitted by the Superior Field Worker (SFW) to the PHC-MO where a village and subcentre wise compilation is done by PHC-MO with assistance from the Health Supervisor.

2. **Wall stencil (VC 1S)**

   Wall stencil (VC 1S) is to be written by SFW on each house after the house has been sprayed. Date, round, insecticide and Squad No. are written as applicable. In SR/ TR the No of rooms sprayed/ Total no of rooms, is entered.

3. **IRS Output Form (VC2)**

   The IRS Output Form (VC 2) is the IRS report to be generated by the PHC & District. It is a village/ Subcentre/ PHC wise compilation of VC1 formats received from the SFWs. As soon as the VC 1 of a village is received, the entire information is transferred into VC 2. It is to be filled in duplicate. Once the spray is completed in the PHC area all the VC1s should be entered into VC2. The PHC-MO shall submit one copy of VC 2 within 15 days of completion of spray in the PHC area to the district and the second copy is retained by the PHC. The DMO shall do a similar PHC wise compilation at the district and send the report within 15 days to the State. The state level report should reach NVBDCP within 45 days of completion of the Round.

4. Primary record of bed net delivery and impregnation (VC3)

The Primary record of bed net delivery and impregnation (VC3) is village level record of bednets available in the households and the details of house wise distribution and impregnation of nets. Prior to the onset of the transmission season the MPW (M) with assistance from ASHA/ AWW/ CHVs will undertake a survey in villages of his subcentre area to enumerate the no. of nets available at the household level. The top left corner of the form pertains to information on the dates of survey, impregnation & distribution of bed nets, village name, SC etc. The house wise details of activities are listed in the middle part. The total requirement of bednets in each household is listed in Col. 4. House wise enumeration of ITNs and LLINs available at the beginning of the current year is done in Col. 5 & 6. This information is filled based on the information available from village survey undertaken by MPW (M). Col 7 & 8 pertain to the actual no. of ITNs/ LLINs distributed in the village in the current year. The total no. of ITNs (available in Col. 5 & 7) in each house impregnated in the current year is entered in col. 9. Based on the no. of bed nets available, distributed and impregnated the no. of effective bed nets in each house hold is estimated in col. 10. The top right corner is a summary of bed net coverage in which % houses with at least two effective nets is entered. The stock status of synthetic pyrethriods is summarized in the lower part of this form.

5. Bednet Output Form (VC 4)

Bednet Output Form (VC 4) is a village/ subcentre/ PHC wise compilation of Bednet impregnation and distribution activities. The village level VC3 is submitted by MPW (M) to the PHC at the completion of bed net distribution and impregnation activities. As soon as VC3 from a village is received it is entered in VC 4. VC4 is filled in duplicate. Once the activities are completed in the entire PHC area and VC4 format has been filled it is sent to the DMO within 15 days of completion of all activity. One copy is retained at the PHC for its own record. The DMO consolidates these reports in next 15 days and sends it to the state. The State should compile and forward the report to NVBDCP. The state report on Bednet Delivery and Impregnation should reach NVBDCP within 45 days of completion all activity in the state.

6. District Annual Stock report on Insecticides (VC 5)

The district should furnish the detailed PHC wise stock report on insecticide usage during the year in VC 5. The report corresponds with the Calendar year (1st January to 31st December). The columns are self explanatory. The report should be compiled by the district from PHC stock registers within 15 days of completion of the reporting year. The state should compile and forward the report within 30 days of completion of reporting year to NVBDCP. Eg The Annual Stock Report on Insecticides for the year 2008 should reach NVBDCP by 31st January of 2009.

7. District LLIN Log (VC 6)

Data on annual distribution of LLINs is entered into District LLIN Log (VC6) at the end of each year from VC4. For the annual planning, the cumulated number of LLINs is calculated from VC6. For LLINs with an expected effective life of 3 years sum the numbers distributed over the last 2 years is taken. Eg. when planning for 2011, the

numbers distributed in 2009 and 2010 should be used (LLINS distributed in 2008 will expire during 2011 and must be replaced). For LLINs with an expected effective life of 5 years sum of the numbers distributed over the last 4 years is taken. Eg. when planning for 2011, the number distributed in 2007-2010 are added. LLINs delivered through ANC must also be included. If LLINs with two different durations are included, use two separate forms for keeping log. Besides when planning for LLIN distribution, the village level bednet surveys undertaken to enumerate the nos existing in each village also needs to be undertaken.

3.1.1.3 Programme Management Monitoring Report (PMMR)

This report is to monitor progress made on different programme processes and other management issues. Update on Training status of the staff as well as the trainings conducted, field visits & reviews conducted and reviews undertaken as well as situation of logistics & stock outs are to be provided on a quarterly basis. The report is given in **Annexure 12.** It has the following three sections:

> Part A: Field visits & reviews
> Part B: Quality of service delivery
> Part C: Training Activity
> Part D: BCC Activity for Malaria Control
> Part E: Status of Logistics

In future this report will also contain data collected by Malaria Technical supervisors through Lot Quality Assurance Sampling (LQAS) based surveys. The report is generated by the district at quarter ending and sent to the State by the 15th of the month following the quarter. The Quarterly State level report should be compiled and should reach NVBDCP by the 21st of the month following. Eg for the 1st Quarter 2009 (1st Jan – 31st Mar 09) the district should forward the report to the state by 15th April 09 and the state should send its report to NVBDCP by 21st of April 09.

3.1.2 Monitoring Indicators

The data collected through the system of HMIS consists of volumes of information but this is of little use, unless it is converted to relevant information through the application of intelligence. Indicators are therefore derived from this data and are used as variables that indicate a particular condition or situation. These indicators point towards programme performance in different areas and help identify problem areas to enable corrective action. The monitoring indicators that are used in the programme are given in the **Table 2:** There is a complete range of indicators reflecting programme areas like case finding, disease burden, programme management etc. The requirement of indicators, at each level of health care delivery, is very specific. At the lower levels like PHCs and Districts indicators are utilized for local decision making while at the National level they are more relevant for policy making and assessing the overall progress. A complete list of levels of health care delivery along with the indicators to be determined at each level is laid down in **Table 3.** Each level of health care delivery is to be encouraged to analyse data based on these recommendations on a regular basis.

S. No.	Area	Indicator	Definition	Frequency	Source of Indicator
Table 2: Monitoring Indicators used in malaria control
A.	**SURVEILLANCE**				
1.	Surveillance/ case finding	No of Fever cases No of Malaria cases No of Pf cases	Fever cases screened Malaria cases diagnosed Pf cases diagnosed	Fortnightly/ Monthlly/ Annual	M1, M4-SC, M4-PHC
2	Surveillance/ case finding	Monthlyl Blood Examination Rate (MBER) (should be more than 1%of population during the transmission season)	{(Number of blood smears examined + RDTs positive in a Month) ÷ Total Population} X 100	Monthly	M4-PHC
3	Surveillance/ case finding	Annual Blood Examination Rate (ABER) (expected to be more than 10%of population)	{(Number of blood smears examined + RDTs positive in a year) ÷ Total Population} X 100	,Annual	M4-PHC
4	Disease burden & impact	Annual Parasite Incidence (API)	{(Total No. of positive blood smears positive for malaria parasite + RDTs positive for malaria Parasite in a year) ÷ Total Population} X 1000	Annual	M4-PHC
5	Disease burden & impact	Annual Falciparum Incidence (AFI)	{(Total No. of blood smears positive for Pf malaria parasite + RDTs positive for Pf malaria Parasite in a year) ÷ Total Population} X 1000	Annual	M4-PHC
6	Disease burden & impact	Test Positivity rate (TPR) (Test = Slide+RDT) Is independent of surveillance activity, therefore a better indicator for impact assessment	{(Total No. of blood smears positive for malaria parasite + RDTs positive for malaria Parasite) ÷ (Total No. of blood smears examined + positive RDTs)} X100	Monthly, Cumulative for the year	M4-PHC
7	Disease burden & impact	Test falciparum Rate (TfR) It is independent of surveillance and indicates Pf preponderance	{(Total No. of blood smears positive for Pf malaria parasite + RDTs found Positive for **P.falciparum)** ÷ (Total No. of blood smears examined + positive RDTs)} X 100	Monthly, Cumulative for the year	M4-PHC
8	Disease burden & impact	Pf Percentage (Pf %) Indicates trends in proportion of cases due to Pf out of total cases	{(Total No. of blood smears positive for Pf malaria parasite + RDTs found Positive for **P.falciparum)** ÷ (Total No. of positive blood smears + positive RDTs for malaria parasite)} X 100	Monthly, Cumulative for the year	M4-PHC

B.	INPUT				
1	Input	% of Staff in Place (ASHA, MPW, MTS, LT, DVBD Consultant)	(No of Staff In place÷ Total no of Staff Sanctioned) X 100	Quarterly, Annual	PMMR
2	Input	Nos of RDTs & ACTs Planned versus Received & used	• Number of RDTs Planned to be used • Number of RDTs received • Number of RDTs used • Number of ACTs Planned to be used • Number of ACTs received • Number of ACTs used • Number of functional microscopes	Annual	M4-PHC PMMR
3	Input	% of spray Equipment in working condition	(No of Spray Equipment in Working Condition÷ No of Spray Equipment Present) X 100	Annual (Pretransmission)	VC 2
4	Input	% of Spray squads engaged	(No of Spray squads engaged ÷ No of Spray squads required) X 100	Annual (Pretransmission)	VC 2
C.	PROCESS				
1	Process	BCC Activities	No of BCC/ IEC Activities eg meetings, rallys, exhibitions, street plays, miking, posters/ pamphlets, wall paintings, etc.	Quarterly, Annual	PMMR
2	Process	% of facilities (SC and PHC) / village level functionaries (ASHA, AWW) reporting stock-out of antimalarials during the fortnight	(No of Health facilities reporting Stock outs in the previous fortnight÷ No of Health facilities) X 100	Fortnightly	M4-SC, M4-PHC
3	Process	% of MPHW/ASHA/other volunteers trained for use of RDT / ACT (calculated separately for different staff)	(Total No of MPW/ ASHA/ other volunteers trained for use of RDTor ACT ÷ Total No of MPW/ ASHA/ other volunteers) X 100	Quarterly, Annual	PMMR
4	Process	% of Diagnostic facilities functional with microscopy/RDT in the last reporting period	(Total No of PHCs/ Pvt Sector Centres with functional microscopy ÷ Total No of PHCs/ Pvt Sector Centres) X 100	Quarterly, Annual	PMMR
5	Process	% of Community level facilities RDT in the last reporting period	(ASHA/ other community volunteers equipped with RDT ÷ Total ASHA / other community volunteers) X 100	Quarterly, Annual	PMMR
D	OUTPU				

1	Output	Utilization of ACT	No of Pf cases treated with ACT	Monthly, Annual	M1, M4-SC, M4-PHC
	Output	Utilization of ACT	No of severe cases treated with inj arte-ether	Monthly, Annual	M4-PHC
2	Output	Bed Nets distributed	Number of nets distributed	Quarterly, Annual	VC-4
3	Output	Bed Nets treated	Number of nets treated	Quarterly, Annual	VC -4
4	Output	Insecticide use Average insecticide per bednet	• Volume of Insecticide used for treatment of Bednets • Volume of insecticide used for bednet treatment/ No of bednets treated • Volume of insecticide used for IRS	Annual	PMMR
E	**OUTCOME**				
1	Outcome	% of Eligible population Covered by ITN Should be 80% or more	(No of households with at least 2 effective bednets ÷ Eligible households) X 100	Annual	VC 4 versus Annual Plan
2	Outcome	% of Targeted population Covered by ITN Should be 80% or more	(Number of households with at least 2 effective bed nets ÷ Targeted households) X 100	Annual	VC 4
3	Outcome	% of Eligible villages with more than 80 % population Coverage with ITNs	(No of Eligible villages with more than 80% coverage with ITNs ÷ No of Eligible villages) X 100	Round wise, Annual	VC 4
4	Outcome	IRS Coverage – Eligible Population (%) Should be 80% or more	(Population covered with IRS ÷ Total Eligible population) X 100	Round wise during transmission season	VC 2 versus Annual Plan
5	Outcome	IRS Coverage – targeted Population (%) Should be 80% or more	(Population covered with IRS ÷ Total Targeted population) X 100	Round wise during transmission season	VC 2
6	Outcome	IRS Coverage – Targeted Rooms % Should be 80% or more	(Rooms sprayed completely in houses Covered÷ Total no of Rooms Targeted) X 100	Round wise during transmission season	VC 2
7	Outcome	% of fever cases with access to prompt diagnosis & treatment	(Fever cases who were tested for malaria by microscopy or RDT with a positive test result and were started on treatment no later than the next day with ACT÷ Total no of fever cases who were tested for malaria by microscopy or RDT with a positive test) X 100	Quarterly/ half yearly	PMMR Based on LQAS

8	Outcome	% households adequately protected by personal protection methods	(House holds in which beneficiaries reported having slept under ITNs or LLINs previous night÷ Total No of houses with bednets surveyed) X 100	Quarterly/ half yearly	PMMR Based on LQAS
9	Outcome	% of PHCs with acceptable level of utilization of ITNs/ LLINs	(PHC sampled in which utilization of ITNs/ LLINs was more than 80%÷ Total No of PHCs sampled for utilization) X100	Quarterly/ half yearly	PMMR Based on LQAS

S. No.	Health Care Level	Programme Area	Indicator (Source of Indicator)
	Table 3: Monitoring at each tier of Health Care Delivery		
1.	**Village - ASHA/ other Community Volunteer**	Surveillance/ case finding	- No of Fever cases **(M1)** - No of Total Malaria cases **(M1)** - No of Pf cases **(M1)** **-** No of Deaths **(M1)**
		Integrated Vector Control	- No of houses completely sprayed **(VC 1)** **-** No of bednets impregnated **(VC 4)** **-** No of houses with at least two bednets **(VC 4)**
		Others	- No of houses assisted in acceptance of spray operations
2.	**Subcentre – MPW (M)/ MPW(F)**	Surveillance/ case finding	- No of Fever cases **(M4-SC)** - No of Malaria cases **(M4-SC)** - No of Pf cases **(M4-SC)** - No of Deaths **(M4-SC)** - No of RDTs received & used **(M4-SC)** - No of ACT Blister Packs received & used **(M4-SC)**
		Integrated Vector Control	- No of ITNs/ LLINs distributed **(VC 4)** - Bednets Treated **(VC 4)** - No of houses with at least two bednets **(VC 4)** - IRS Coverage – Population (%) **(VC 1)** - IRS Coverage – Rooms (%) **(VC 1)**
		Others	- Outbreaks Reported **Yes/ No**
3	**PHC**	Surveillance/ case finding/ Disease Burden	- Monthly Blood Examination Rate (ABER) **(M4-PHC)** - Annual Blood Examination Rate (ABER) **(M4-PHC)** - No of Fever cases **(M4-PHC)** - No of Malaria cases **(M4-PHC)** - No of Pf cases **(M4-PHC)** **-** No of deaths due to Malaria **(M4-PHC)** - Annual Parasite Incidence (API) **(M4-PHC)** - Annual Falciparum Incidence (AFI) **(M4-PHC)** - Test Positivity rate (TPR) **(M4-PHC)** - Test falciparum Rate (TfR) **(M4-PHC)** - Pf Percentage (Pf %) **(M4-PHC)**
		Integrated Vector Control	- Insecticide use **(VC 2, VC 5)** - No of ITNs/ LLINs distributed **(VC 4)** - IRS Coverage (Eligible) – Population (%) **(VC 2)** - IRS Coverage (Targeted) – Population (%) **(VC 2)** - IRS Coverage – Rooms (%) **(VC 2)** - % of Eligible population Covered by ITN **(VC 4)** - % of Targeted population Covered by ITN **(VC 4)** - % of Eligible villages with more than 80 % population Coverage with ITNs- Bednets Treated **(VC 4)** - % of house holds in which beneficiaries reported having slept under ITNs/ LLINs previous night **(PMMR)** - % of fever cases who were tested for malaria by

			microscopy/ RDT with a positive test result for RDT and were started on treatment no later than the next day with ACT **(PMMR)**
		Others	- No of RDTs received & used **(M4-PHC)** - No of ACT Blister Packs received & used **(M4-PHC)** **- Outbreaks Reported (M4-PHC) Yes/ No** - % of MPHW/ASHA/other volunteers trained for use of RDT / ACT **(PMMR)** - % of Diagnostic facilities functional with microscopy/RDT in the last reporting period **(PMMR)** - No of BCC Activities **(PMMR)**
4	**District**	Surveillance/ case finding/Disease Burden/ Impact	- Monthly Blood Examination Rate (ABER) **(M3)** - Annual Blood Examination Rate (ABER) **(M3)** - No of Fever cases **(M4)** - No of Malaria cases **(M4)** - No of Pf cases **(M4)** - No of deaths due to Malaria **(M4)** - Annual Parasite Incidence (API) **(M4)** - Annual Falciparum Incidence (AFI) **(M4)** - Test Positivity rate (TPR) **(M4)** - Test falciparum Rate (TfR) **(M4)** - Pf Percentage (Pf %) **(M4)** - % of fever cases who were tested for malaria by microscopy/ RDT with a positive test result for RDT and were started on treatment no later than the next day with ACT **(PMMR)**
		Integrated Vector Control	- % of spray Equipment in working condition (**VC 2**) - % of Spray workers trained (**VC 2**) - Insecticide use (**VC 2, VC 6**) - No of ITNs/ LLINs distributed (**VC 4**) - IRS Coverage (Eligible) – Population (%) (**VC 2**) - IRS Coverage (Targeted) – Population (%) (**VC 2**) - IRS Coverage – Rooms (%) (**VC 2**) - % of Eligible population Covered by ITN **(VC 4)** - % of Targeted population Covered by ITN **(VC 4)** - % of Eligible villages with more than 80 % population Coverage with ITNs- Bednets Treated **(VC 4)** - % of house holds in which beneficiaries reported having slept under ITNs/ LLINs previous night **(PMMR)** - % of PHC sampled in which utilization of ITNs/ LLINs was more than 80% **(PMMR)**
		Others	- Full Time DVBDCO/ DMO **Yes/ No** - No of RDTs Planned versus received & used **(M4)** - Outbreaks Reported **Yes/ No** - No of ACT Blister Packs Planned versus received & used **(M4)** -% of facilities (SC and PHC) / village level functionaries (ASHA, AWW) reporting stock-out of antimalarials lasting more than 15 days during the quarter **(PMMR)** - % of Staff in Place (ASHA, MPW,MTS, LT, DVBD Consultant) **(PMMR)**

			- % of MPHW/ASHA/other volunteers trained for use of RDT / ACT **(PMMR)** - % of Diagnostic facilities functional with microscopy/RDT in the last reporting period **(PMMR)** - No of BCC Activities (**PMMR**)
5	**State**	Surveillance/ case finding/ Disease Burden/ Impact	- Annual Blood Examination Rate (ABER) **(M3)** - No of Fever cases **(M4)** - No of Malaria cases **(M4)** - No of Pf cases **(M4)** **-** No of deaths due to Malaria **(M4)** - Annual Parasite Incidence (API) **(M4)** - Annual Falciparum Incidence (AFI) **(M4)** - Test Positivity rate (TPR) **(M4)** - Test falciparum Rate (TfR) **(M4)** - Pf Percentage (Pf %) **(M4)** - % of fever cases who were tested for malaria by microscopy/ RDT with a positive test result for RDT and were started on treatment no later than the next day with ACT **(PMMR)**
		Integrated Vector Control	- % of spray Equipment in working condition (**VC 2**) - % of Spray workers trained (VC 3) - Insecticide use (**VC 2, VC 6**) - No of ITNs/ LLINs distributed **(VC 4)** - IRS Coverage (Eligible) – Population (%) **(VC 2)** - IRS Coverage (Targeted) – Population (%) **(VC 2)** - IRS Coverage – Rooms (%) **(VC 2)** - % of Eligible population Covered by ITN **(VC 4)** - % of Targeted population Covered by ITN **(VC 4)** - % of Eligible villages with more than 80 % population Coverage with ITNs- Bednets Treated **(VC 4)** - % of house holds in which beneficiaries reported having slept under ITNs/ LLINs previous night **(PMMR)** - % of PHC sampled in which utilization of ITNs/ LLINs was more than 80% **(PMMR)**
		Others	- Full Time SPO **Yes/ No** - No of RDTs Planned versus received & used **(M4)** - No of ACT Blister Packs Planned versus received & used **(M4)** **-** Outbreaks Reported **Yes/ No** -% of facilities (SC and PHC) / village level functionaries (ASHA, AWW) reporting stock-out of antimalarials lasting more than 15 days during the quarter **(PMMR)** - % of Staff in Place (ASHA, MPW,MTS, LT, DVBD Consultant) **(PMMR)** - % of MPHW/ASHA/other volunteers trained for use of RDT / ACT **(PMMR)** - % of Diagnostic facilities functional with microscopy/RDT in the last reporting period **(PMMR)** - No of BCC Activities (**PMMR**)
6	**National**	Policy and strategy development,	- Sites to monitor post-purchase quality of RDTs, drugs and insecticides recommended for use by national policy

			- Each of the established drug resistance monitoring sites completes at least one successful study every second year - Independent external evaluations carried out at least twice during 80 project implementation - All endemic districts have quality-controlled data on incidence of vector-borne diseases segregated by age-group and gender
		Surveillance/ case finding/ Disease Burden/ Impact	- Annual Blood Examination Rate (ABER) **(M3)** - No of Fever cases **(M4)** - No of Malaria cases **(M4)** - No of Pf cases **(M4)** **-** No of deaths due to Malaria **(M4)** - Annual Parasite Incidence (API) **(M4)** - Annual Falciparum Incidence (AFI) **(M4)** - Test Positivity rate (TPR) **(M4)** - Test falciparum Rate (TfR) **(M4)** - Pf Percentage (Pf %) **(M4)** - % of fever cases who were tested for malaria by microscopy/ RDT with a positive test result for RDT and were started on treatment no later than the next day with ACT **(PMMR)**
		Integrated Vector Control	- % of spray Equipment in working condition (**VC 2**) - % of Spray workers trained (VC 3) - Insecticide use (**VC 2, VC 6**) - No of ITNs/ LLINs distributed **(VC 4)** - IRS Coverage (Eligible) – Population (%) **(VC 2)** - IRS Coverage (Targeted) – Population (%) **(VC 2)** - IRS Coverage – Rooms (%) **(VC 2)** - % of Eligible population Covered by ITN **(VC 4)** - % of Targeted population Covered by ITN **(VC 4)** - % of Eligible villages with more than 80 % population Coverage with ITNs- Bednets Treated **(VC 4)** - % of house holds in which beneficiaries reported having slept under ITNs/ LLINs previous night **(PMMR)** - % of PHC sampled in which utilization of ITNs/ LLINs was more than 80% **(PMMR)**
		Others	- No of Full Time SPO - Full Time DVBDCO/ DMO **Yes/ No** - No of RDTs Planned versus received & used **(M4)** - No of ACT Blister Packs Planned versus received & used **(M4)** **-** Outbreaks reported **Yes/ No** -% of facilities (SC and PHC) / village level functionaries (ASHA, AWW) reporting stock-out of antimalarials lasting more than 15 days during the quarter **(PMMR)** - % of Staff in Place (ASHA, MPW,MTS, LT, DVBD Consultant) **(PMMR)** - % of MPHW/ASHA/other volunteers trained for use of RDT / ACT **(PMMR)** - % of Diagnostic facilities functional with microscopy/RDT in the last reporting period **(PMMR)** - No of BCC Activities (**PMMR**)

3.1.6 Interpretation of Indicators

The main disease incidence indicators listed in Table 2 can be calculated from the data available from M4 for virtually any level, from village to national level. All suspected cases of malaria in the country (or district or village) are captured in M1 and consolidated correctly into M4, the resultant indicator values for API, TPR etc. are then calculated based on the formula described. All surveillance and disease burden indicators should be assessed for an increase or decrease from the previous year. When the current year is being considered the corresponding period of the previous year is used for comparison. API of More than 5%, TPR of more than 5%, Pf% more than 50% should always raise an alarm. These indicators are also used to identify high risk areas and identify areas to be focused on priorty. 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 the coverage of IRS or ITN at least 80 % coverage of targeted population should be the acceptable cut off. Service delivery or utilization below this should be considered inadequate.

3.1.7 Data Quality

Under the programme it is important to ensure that the data collected through reports should be complete, accurate and consistent. This is possible only when records are maintained immaculately on a regular basis and a system of verification of reports exists. Therefore, the quality of data is the responsibility of the Officer Incharge/ signing authority. Whenever reports are complied the signing authority should validate a sample of records and reports e.g. the BMO should recheck the compliation of M4 of all Subcentres into M4 at PHC each month. It is also necessary to verify data during onsite visits of villages, subcentres and districts. During field visits the supervisory staff like MTS, PHC/ District /State/ Centre level personnel should make an effort to crosscheck M1 for the individual patient records and visit patients diagnosed and treated in the previous month. Similarly a sample of reports should also be reworked from the records to check for their validity. The reports should also be tracked for timeliness and complete each time they are received. The time schedule for each report is mentioned in **Table 4**.

S. No.	Report	Time Schedule
1	Fortnightly Report by ASHA/ Community Health Volunteer/ MPW/ PHC (M1)	Ist Fortnight- 21st of the month IInd Fortnight- 7th of following month
2	Fortnightly Report of cases (M4-SC)	Ist Fortnight- 25th of the month IInd Fortnight- 10th of following month
3	Fortnightly Report of cases (M4 PHC)	Ist Fortnight- 28th of the month IInd Fortnight- 13th of following month
4	Fortnightly Report of cases (District)	Ist Fortnight- 30th of the months

			IInd Fortnight- 15th of following month
5	Fortnightly Report of cases (State)	Ist Fortnight- 5th of the months IInd Fortnight- 10th of following month
6	IRS output (VC2) – Round wise	PHC – 15 days of completion of Spray District – 30 days of completion of spray State - 45 days of completion of Spray
7	Bednet Delivery and Impregnation form (VC 4)	PHC – 15 days of completion of activity District – 30 days of completion of activity State - 45 days of completion of activity
8	District Programme Management Monitoring Report (PMMR)	15th day of the following quarter
9	State Programme Management Monitoring Report (PMMR)	21st day of the following quarter

3.1.8 Feedback Mechanisms, Data sharing and Transparency

There should be a two way flow of information in any system of data management. Therefore, a system of preliminary traking of reports for data timeliness, completeness and consistency should be in place and a system for prompt feedback on such discrepancies observed should be establised at all levels. Beside this there should be timely review of all reports received on epidemiological and programme management aspects. Any unusual deviation in various monitoring parameters should be communicated to the reporting units. The Centre/ State/ District / PHC should establish this system through regular letters and e-mails, with their respective reporting units to notify the observations made. The reporting unit should respond within one week to such correspondence with required clarifications.

The centre/ district and state should also come up with Annual reports for the reporting units which should be widely disseminated.

3.1.9 Programme Review

Regular review of program by authorities is a way of taking stock of programme progress as well as it provides opportunity of interacting with the implementing partners to address administrative issues. It is imperative that such reviews are organized at regular interval which reflects commitment of the highest order. The norms for such review are as follows:

S. No	Level	Type of review	Time schedule
1	Centre	Biannual review of States by Centre	1 per 6 months
2	State	Quarterly review of District by State (in First month of the following quarter)	1 Per Quarter
3	District	Monthly review of NVBDCP under chairmanship of District collector	1 Per month per District
4	District	Monthly review of NVBDCP by DMO/ DVBDCO with his staff	1 Per month per District

The participation of highest level administrative officials should be ensured in programme monitoring. Wherever possible the Health Secretary should be involved in such programme reviews at State level. The District collector should also review the programme as per the prescribed norm especially in the transmission season. Microplanning of IRS as well as continuous monitoring of its implementation should be a District Collector driven initiative. The checklists to be used by Health Secretary and District Collector in such reviews are given in **Annexure 13, 14**.

CHAPTER 4.

SENTINEL SURVEILLANCE FOR MALARIA

4. Surveillance

Surveillance is defined as the ongoing and systematic collection, analysis, interpretation, and dissemination of data about cases of a disease and is used as a basis for planning, implementing, and evaluating disease prevention and control activities. Malaria surveillance in India is a system based mainly on slide results, which has been refined over many years. It provides reliable data on trends of cases and deaths reported in the Public health care system, but does not provide relevant information on severe and uncomplicated malaria.

4.1 Purpose of sentinel surveillance for malaria control

Very little data is available on severe cases of malaria, their management and on malaria deaths in India. Timely referral of cases to PHCs/ District Hospitals/ Tertiary centers and their proper management in these centers limits mortality associated with malaria. Therefore, to monitor case referral and practices in in-patient case management it is important that this data is collected, compiled and analyzed. Furthermore, improvements in malaria case management (especially rapid diagnostic tests and artemisinin-based combination therapy (ACT) for falciparum malaria, which will be introduced in India on a large scale, may well lead to short-term increases in the annual parasite incidence (API) because more patients may be attracted to primary level services. However, these improvements should lead to a decrease in the incidence of severe malaria and malaria deaths. Thus, monitoring of these latter events becomes essential for assessing impact. Aside from this, high or increasing numbers of in-patients from specific peripheral areas in a district may be a warning sign of a deficiency of primary level services or impending outbreaks.

Analysis of data on such cases can provide important additional information, for example: If severe malaria is very frequent in pregnant women, additional efforts must be made to prevent malaria in this particular group. Age trends may be informative; if for example, a large proportion of cases occur in young children, transmission is probably taking place in villages, but if most cases are in young men, it probably does not. If people of a certain tribe are often hospitalized with malaria, they must be at high risk; if they never get hospitalized for malaria, there may be some kind of barrier.

Since the health infrastructure in the country has limited capacity to manage voluminous data, it is not feasible, at least at this point in time, to collect detailed information on in-patients from all PHCs. To obtain reliable, representative information on severe cases of malaria, Sentinel Sites will be selected in each district. These sites will act as watch dogs and providing detailed information on indoor patient admissions. This data when analyzed over a period of time would thus represent the trends in malaria related mortality and incidence of severe malaria.

4.2 Norms for establishing Sentinel Sites

A minimum of two sentinel sites will be established in each district. As this is a new activity and quality is paramount, districts should normally start with only two sites and consider expansion later. Hospitals with large OPDs and inpatient case loads should be chosen. Therefore, the district hospital will automatically qualify as one such site. Other sites are selected amongst the PHCs/ CHCs /private/faith-based hospitals. It is desirable to have sentinel sites in the private/faith-based sector as many patients seek care there and this data is most often not reflected in the HMIS. Districts which have Medical Colleges should establish a site in these tertiary care centers, if they habitually admit many malaria cases.

The Sentinel Sites should be adequately staffed and Medical Officers and laboratory technicians (LTs) should be trained. A nodal Medical Officer (SSMO) should be in charge of all activities regarding malaria in the sentinel sites. There should be a laboratory with a qualified laboratory technician in charge, where malaria microscopy is quality controlled according to new NVBDCP standards. At each sentinel site, the LT (SSLT) working under the supervision of the SSMO will be responsible for the quality of the malaria laboratory results and for data compilation. A central register for fever cases without any other obvious cause (suspected malaria) should be maintained at each Sentinel Site called Sentinel Site-Malaria Register (SSMR). (**Annexure 15**). Each day the SSLT will record information of all suspected malaria cases from the Lab Register of the Sentinel Site into the SSMR. Information of all fever cases from different OPDs and on in-patients is entered on the same form to avoid double-counting and difficulties in patient identification. After entering the data, SSLT notes elements, which need to be re-checked and obtains necessary clarifications on the same day from the OPDs. The record for inpatients is completed from the respective case sheets and the final outcome cured & discharged/ died/ referred or left without discharge is carefully recorded. Every SSMR, which has not been completed with in-patient information, is taken to the relevant in-patient department weekly until it has been completed. The paperbased SSMP are filed in the health facility, where they have been generated. At the end of each fortnight the Sentinel Site Report (**Annexure 16**) is generated from the Sentinel Site –Malaria Register by the SSLT.

4.3 Recording, Reporting and Use

Data entry

A standard database with a data entry portal corresponding to the SSMR will be entered in NAMMIS and the entry portal will include a check on errors.

At the end of each fortnight, the line list of suspected Malaria cases will be entered into NAMMIS. After becoming proficient in this, SSLT may delegate this work to a clerk.

In addition, SSLT collects data at the end of each month on total number of out-patients, total number of in-patients and total number of in-patient deaths, all separated by gender and below 5 years/ 5 years and above. These data are entered in a relational database, so that they can be used as denominator.

Outputs, reports, interpretation and use

At each SS

Every Fortnight: Fortnightly output of the below indicators with their breakdowns. Graph showing fortnightly trend over current calendar year of indicators 1-4 (without breakdown).

Every month: Corresponding monthly output.

SSMO is responsible for scrutinizing weekly and monthly outputs and to alert BMO to any finding, which requires urgent attention.

Fortnightly and monthly outputs are submitted to Block Medical Officer (BMO).

Block Medical Officer

Monthly output is submitted by BMO with narrative interpretation and comments to DVBDCO, in particular on findings which require attention or action. Initiates relevant action, if any data suggest an emergency problem.

Every year: Corresponding annual output, and additional computer analyses as requested by SSMO/BMO/DVBDCO

DVBDCO

Annual outputs from all SSs are sent by DVBDCO with narrative interpretation and comments to State NVBDCO as part of the annual malaria report. An annual summary is prepared by State VBDCO as part of annual malaria report.

The routine outputs are generated by NAMMIS. This means that once the data have been entered, the routine outputs are generated by a few clicks by the SSLTs. SSLTs and district data managers will be trained to generate additional analyses requested.

4.4 Main indicators

The data from sentinel sites will give information on age specific morbidity & mortality due to malaria, especially under 5 morbidity and proportional mortality rate due to malaria. The following indicators are to be derived from the data obtained from M5.

S. No.	Indicator	Description	Breakdown (with percentages)
1	Number of out-patient cases of malaria	Self-evident	Clinical/confirmed, under 5/ 5yrs and above, M/F, Pv/Pf, sub-centre area
2	Number of in-patient cases of malaria	-"-	-"-
3	Number of cases of severe malaria	-"-	Clinical/confirmed, under 5/ 5yrs and above, M/F, sub-centre area
4	Number of malaria deaths	-"-	Clinical/confirmed, under 5/ 5yrs and above, M/F, sub-

			centre area
5	% OPD cases attributed to malaria	Total no of cases of OPD malaria/Total OPD X 100	Under 5/ 5yrs and above
6	% in-patient cases attributed to malaria	Total no of cases of in-patient malaria/Total OPD X 100	
7	Proportional mortality due to malaria	Total no of deaths due to malaria in hospital admissions / Total no of deaths in hospital admissions X 100	
8	Case fatality rate of falciparum malaria	Total no of confirmed malaria deaths/total no. of falciparum malaria cases X 100	
9	Case fatality rate of confirmed severe malaria	Total no of confirmed malaria deaths/total no. of confirmed severe malaria cases X100	

CHAPTER 5

SPECIAL SURVEYS

The surveillance and program monitoring on the basis of data reported through the routine system and sentinel sites provides a fairly comprehensive picture of the progress of the program towards its objectives. However, this is not sufficiently objective, because it consists of data or reports generated within the program. Any shortcomings inherent to the system are therefore inadvertently incorporated into the picture drawn by them. This system also does not cover the patients seeking care from the private sector (other than a few sentinel sites). The programme indicators thus obtained from the routine and sentinel surveillance system are not true estimates, therefore, to plug such gaps, and to lend more objectivity to program monitoring and evaluation, assessments independent of the HMIS will be periodically carried out.

Two types of surveys are to be conducted in the programme:

A. Small scale Quarterly or Half yearly Surveys based on Lot Quality Assurance Sampling (LQAS)

Lot Quality Assurance Sampling (LQAS) is sampling method originally used in the early twentieth century by industries to test quality of batches of products in an assembly line. The requirement in that context was a sample just sufficient to determine if there was more than a certain acceptable proportion of faulty products per batch. Using binomial probabilities, it was demonstrated that a small sample was sufficient to "pass" or "fail" a given batch or lot of the product in question. This principle has been put to use in public health program settings, particularly for child health but also for a number of other contexts, to provide reasonable results, since more than twenty years globally. This method has not yet been used widely in the Indian public health programs, but holds considerable promise in contexts where it is possible to periodically conduct such small sample surveys.

In essence, the LQAS sampling method comprises of collecting survey data from small but perfectly random samples drawn from a well-defined universe, typically called a supervisory area, such as a sector or block. A commonly used sample size for each such area is 19, such as 19 households or 19 individuals. The survey tools consist of the usual, standard questions used in sample surveys, such as questions related to utilization of bednets or to prompt diagnosis and treatment of fever, but the answers are always coded and analyzed as dichotomous variables (each question has two possible answers: "yes" or "no"). While this sample of 19 cannot provide a reliable point estimate for an indicator, it can reliably tell whether the sampled area has exceeded a "target" prevalence for the indicator. For instance, if the question is whether or not 80% of individuals in a block PHC area sleep under bednets, a random sample of 19 individuals from this universe can reliably tell whether this is true. In this case, a statistically computed cut-off of 13 is used: if in the survey, 13 or more out of 19 individuals say they slept under the bednet on the night before the survey, one may say with 92% confidence that 80% or more people in the block sleep under bednets. The sample size of 19 is the smallest that can give results with acceptable reliability, and therefore is commonly used. Increasing the sample size does not significantly increase the reliability in making such a decision.

In the malaria control program, it has been proposed that the LQAS method will be used for generating information about the coverage of important process and outcome indicators at the sub-district (block PHC) levels. The MTS will be trained to collect and tabulate data from a sample of 19 households or individuals in each block PHC that they cover. Each round of data collection will yield a result for each block – whether or not the block has exceeded a certain pre-determined target coverage. Only a small number of questions will be used, to maintain feasibility of data collection within program settings. Several rounds of data collection can take place during a year, depending upon the need and feasibility, and will provide a sense of how each block is progressing. For each round of data, district level coverage of the indicators will be computed by cumulating the samples of 19 from all the blocks, and adjusting for relative population size. Similar weighted estimates for the state level will be generated by pooling data from all districts. The use of periodic small surveys in this manner is expected to provide valuable information to help program monitoring, planning and implementation at all levels – to PHC MO and team, the DMO and team, and the state directorate and ministry.

The sample of 19 in a block is typically spread over 19 villages. Thus, one household or individual each is sampled from 19 villages. Such a widely spread sample is expensive for a survey investigator to collect, but surveys using LQAS cost very little because the data is collected as a part of the routine field visits of supervisors. It is expected that the MTS will visit up to 2-3 villages a day on his/her motorcycle, and collect this data in prescribed forms along with conducting the rest of his/her supervisory duties in the village, such as interacting with the ASHA, examining records and stocks, meeting people, etc. This will make the use of this method feasible. It should also be noted that the questions required to elicit information to generate estimates of key indicators are also the same questions that the MTS must ask to perform the supervisory role. In this sense, the data collection effort is not an addition to the envisaged job of the MTS.

The number of rounds of data collection per year and the number of blocks covered in each round will depend on the need and feasibility, and if all blocks cannot be covered in each round, a statistical sample of blocks will need to be drawn, repeating some blocks in each subsequent round. This method, also called Large Country LQAS (LC-LQAS) may have to be applied in some settings.

Since this is the first time this method is being used in the Indian health program context, the experience will be reviewed periodically and refined until it is well-established. It has been suggested that, in the Indian context LQAS may be renamed as "Local Quality Assurance Surveys", to emphasize the role of a program monitoring tool.

B. Large scale Surveys

The surveys are designed to capture the main outcome indicators of the programme and other data. Such house hold level surveys are conducted every 2-3 years by an Independent agency. Expertise of WHO, NIMR is also sought to support the planning and implementation of these surveys and to participate in the evaluation exercise together with NVBDCP and selected Indian institutions. The methodologies of these

surveys are developed in consultations held with the Independent agency hired for the purpose.

The programme also undertakes in-depth review of programme implementation through Joint Monitoring Missions organized together with its partners in malaria control like NIMR, WHO and World Bank. Such reviews bring to light programme short comings in the area of policy and implementation and enable improvements in programme design.

CHAPTER 6.

EVALUATION

Periodic large scale evaluations of Programme are carried out by independent observers. NVBDCP may call for an independent agency to undertake such reviews which comprise of an indepth assessment of all programme aspects like case diagnosis & management, treatment seeking behaviour of the community, coverage of vector control interventions and community acceptance, impact of BCC activities on community awareness and practices. NVBDCP also undertakes special Joint Monitoring Missions (JMM) along its partners in malaria control like WHO and World Bank. These large scale evaluations are conducted usually at 5 yearly intervals, to allow for passage of sufficient time for impact to become evident.

Besides this the programme undertakes annual evaluation of programme implementation in high risk areas. This activity is outlined in following paragraphs.

6.1 Central 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 Dte NVBDCP, ICMR/ NIMR Institutes, Regional Offices, State Offices & Districts.

6.1.1 Objectives

The objectives of the Evaluation are as follows:

A. To evaluate the preparatory activities for IRS in the selected districts and estimate IRS coverage
B. To assess the status of programme implementation in the district with particular focus on activities of ASHAs and utilization of RDTs,
C. To assess distribution of Bednets and estimate utilization of bednets by beneficiaries

6.1.2 Methodology

At the beginning of the transmission season the Centre selects the highest endemic districts of the country on the basis of ABER, API and Pf % of the previous year. Central teams visit these districts twice during the transmission season, once in each round of IRS. In the selected high endemic districts two high burden and high risk PHCs are selected based on ABER, API and Pf%. In each PHC area 2 subcentres are to be selected for evaluation of Indoor Residual Residual Spray (IRS), followed by selection of 2 villages in each Subcentre area. Selection of villages is done in such a manner so that in one village concurrent evaluation of IRS is possible on the day of visit; the selection of 2nd village is done such that IRS is completed and consecutive evaluation is possible. The ASHAs of each selected village are also interviewed.

In each of the selected PHCs ,2 more Subcentres are selected in which maximum numbers of bednets were distributed in the season. If bednets were not distributed in the selected areas, other PHCs may be selected for the purpose. In each subcentre, villages in which most number of bednets was distributed in the season are selected. In each of these villages 50 % of benificiaries are selected on a random basis from the records and assessed for utilization of bednets. The ASHAs of each selected village are also interviewed.

The evaluation is conducted with the aid of prescribed checklists and indicators are determined. The checklist to be used for the purpose by the central teams is given in **Annexure 17A, 17B, 17C**. The diagrammatic representation of the methodology is given in **Fig1.**

Fig1. Methodology for Conducting Central Evaluation
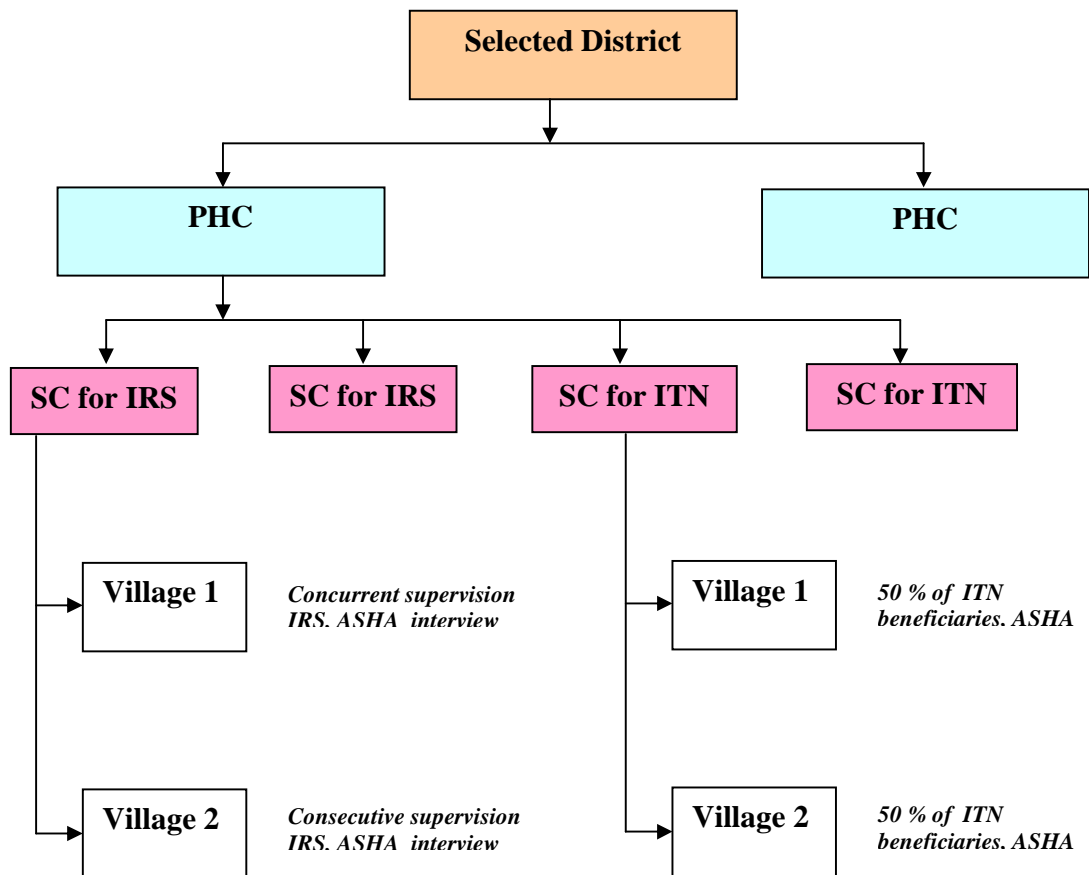
The reports of the teams are submitted to NVBDCB, where compilation and review of programme implementation is done. The state may devise similar system of evaluation of its own to strengthen the system of regular monitoring.

CHAPTER 7.

SUPPORTIVE SUPERVISION

7.1 Supportive Supervision:

Supportive supervision is a continuous process which aims to increase the knowledge, develop the skills, improve the attitude and enhance the motivation of the health care functionaries. Supportive supervision is not an instrument for fault finding but aids in identification of problems, solving them and improving performance. It provides an opportunity to the supervisor and health workers to identify and address weaknesses together, thus preventing poor practices from becoming routine. Progression from traditional to supportive supervision may require changes in attitudes, practices and perceptions on the part of supervisors.

The protocol of supervision for each level of staff is given in **Table 5**.

Table 5 : Supervisory protocol for staff under NVBDCP

Level	Staff	Frequency
Sub Centre	MPHW (F); MPHW(F)	Visit 1 ASHA per village during their visit & 2 patients treated by her in the last one month (checked from her record) Supervise IRS rounds in their villages as per Supervisory Schedule for IRS
PHC	MPHS (F); MPHS(M)	As per their supervisory schedule visit all subcentres in the PHC During visit to subcentres, try to visit remote villages and interview ASHA and 2 patients treated by ASHA in the last one month (checked from her records) Supervise IRS rounds in their villages as per Supervisory Schedule for IRS
	MO	Visit all subcenters in the PHC once a month During visit to subcentres, try to visit remote villages and interview ASHA and 2 patients treated by ASHA in the last one month (checked from her records) Supervise IRS rounds in their villages as per Supervisory Schedule for IRS
Block PHC CHC/FRU/Sub Dist. Hosp.	MPHS (F); MPHS(M); MO	As described above
	MO	Visit all PHCs & microscopy centres in the area of Block BHC once a month Monitor sentinel sites once a month

Level	Staff	Frequency
		Visit all Subcentres once in 2-3 months
		During visit to subcentres, try to visit remote villages and interview ASHA and 2 patients treated by ASHA in the last one month (checked from her records)
		Supervision of IRS rounds in the area of Block PHC
	Malaria Technical Supervisor (where deployed)	Visit all PHCs and microscopy centres in the Malaria Unit (MU)once a month
		Visit all sentinel sites in the MU once a month
		Visit all subcentres once in 2 months; visit all villages once in 6 months
		During visit to subcentres, try to visit remote villages and interview ASHA and 2 patients treated by ASHA in the last one month (checked from her records) Supervise IRS rounds in the area of MU, especially the remote and operationally difficult areas
		Further details are given in the Training Module of Malaria Technical Supervisor (MTS), The Checklist to be used by the MTS is given in Appendix 4
District	District Malaria officer	Visit all PHCs and microscopy centres in the district once in 2-3 months. During each such visit, 2-3 subcentres are to be visited in each PHC area.
		Visit all sentinel sites in the district once a month.
		Check laboratory function in each visit of microscopy centre & sentinel site.
		During visit to subcentres, try to visit remote villages and interview ASHA and 2 patients treated by ASHA in the last one month (checked from her records)
		Supervise IRS rounds in the district, especially the 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 ASHA and 2 patients treated by ASHA in the last one month (checked from her records)

Level	Staff	Frequency
		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/ Officer from SPO Officer	1 - 3 districts to be visited every month. All districts to be covered once in a year.
Regional Offices	RD/ Officers from RD Office	1 district to be visited every month

7.2 To Establish Supportive Supervision

A. Improve performance

- Use a protocol/standard operating procedure including a supervisory checklist for each type of unit supervised. **(Eg. Checklist of MTS at Annexure 18)**
- Conduct supportive supervisory visits also **within** health care facilities you are in charge of.
- Provide staff with updates on policies or new recommended practices. Undertake on-the-job training see above supported by guidelines, manuals, visual aids.
- Plan supervision schedule in advance and communicate it to all those, who need to know. Lesser performing health facilities should receive extra, or more lengthy visits, so make sure that the initially planned schedule has slack time for this.
- Plan these visits as much as possible, when it is possible to observe the staff and interview patients. Talk to patients about the quality of services, preferably away from the health facility.
- Plan to spend sufficient time (from several hours, to a full day or more) to conduct the supervisory visit to each unit. Rushed visit with no time for dialogue are inefficient.
- Follow up on recommendations made during previous visits. Discuss progress with the health facility
- Check the stocks and the condition of equipment. Compare stocks with records. Are storage conditions correct? If not, help find solutions. Carry materials, and supplies for the health facility according to requests made or needs identified at previous visit.
- Review health facility records. and provide feedback to the staff as well as MO in charge.
- Analyse programme indicators for the health facility to make the performance objective and measurable.
- Involve the community in the evaluation process. Ask community members how they are treated when they visit the facility. Talk to community leaders during the visit to get their feedback and identify jointly, what the community can do.
- Find out, if the relationship between community and health workers is good; if not, find out what is wrong and remedy the situation.

- Discuss strengths and weaknesses, and actions to be taken (by whom and by when).
- Identify gaps and solve problems in positive ways
- Praise health workers in public for good performance and for practices that meet quality. Correct performance only through person-to-person contacts.
- Work with other health programmes to coordinate supervisory activities in a spirit of mutual support.
- Schedule a return visit before leaving the site.

B. Maintain and enhance motivation

- Give praise and 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 if possible. Talk to staff about their work situation, needs and ambitions.
- Act on feedback from the health workers, health workers will feel valued that they have an impact. Show that you trust them (as much as you actually do)
- Establish monthly meetings with all health facilities within a district. This provides an opportunity for health workers to learn new approaches and strategies used in different health facilities and to receive continuing education. It can also be a forum to acknowledge their achievements.

C. Build sustainability

- Collect data on positive results gained from supportive supervision, such improved performance of health workers, improved coverage of IRS, better treatment etc.
- Develop a team approach to increase supportive supervision at the health facility and make it a routine procedure, with or without frequent visits from the central or district level.
- Health facility staff can develop supervision plans that fit their structures and conduct regular self-assessments to monitor their performance.