

REPORT

Household Survey and Health Facility Survey

for

In-Depth Review of NVBDCP (Malaria)



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Acknowledgements

I wish to acknowledge the initiative taken by Govt. of India to carry out In-Depth Review of National Vector Borne Disease Control Programme. I am very grateful to Dr. P.L. Joshi, Director, NVBDCP for assigning this responsibility to National Institute of Malaria Research (NIMR). My thanks are also due to Dr. T. Krongthong, Regional Advisor (Malaria) WHO-SEARO, Dr. A. Chatterjee, National Professional Officer, WHO, Dr. B. Manyame, WHO Consultant for their active involvement in this project, help in designing the tools, field visits and analyzing the data. I am also thankful to Dr. Padam Singh, Member, National Statistical Commission and Head – Research and Evaluation, EPOS Health (India) Pvt. Ltd., Dr. Abha R. Aggarwal, Asstt. Director, National Institute of Medical Statistics, (ICMR), Dr. K.V. Rao, Director General and CEO, and Dr. G. C. Manna, Director, National Statistical Survey Organization (NSSO) for their help in developing the statistical design and sampling aspects of these surveys. I am thankful to Dr. G.N.V. Ramana, Senior Public Health Specialist, World Bank for his involvement and valuable suggestions for the surveys.

I am indebted to Prof. Vijay Kumar for his advices, help and complete involvement in all aspects of the studies since its inception. My sincere thanks are also due to Dr. Shampa Nag, Consultant, WHO for her interest and suggestions for this study. Dr. R.K Das Gupta, Deputy Director, NVBDCP participated in several consultative meetings. His interest and helpful suggestions are gratefully acknowledged. I am grateful to the State Programme Officers, District Malaria Officers, Medical Officers of Primary Health Centers for their continuous support and guidance during the survey. I am also grateful to all doctors and staff of the Govt. and Private hospitals and several other resource persons who have co-operated and assisted our staff and provided the desired information while conducting the health facility and household surveys in Maharashtra, Orissa, Rajasthan, Assam and Chennai.

My sincere thanks are also due to Dr. C.P. Batra, Asstt. Director, NIMR, Delhi, Dr. Vas Dev, Deputy Director, NIMR, Sonapur (Assam), Dr. S.K. Sharma, Asstt. Director, NIMR, Rourkela (Orissa), Dr. A.K. Mishra, Asstt. Director, NIMR, Jabalpur (MP), Dr. Alex Eapen, Research Scientist, NIMR, Chennai (Tamil Nadu) who alongwith their dedicated Officers/Staff/Distt. Coordinators, Supervisors, Surveyors, Field Guides etc. painstakingly and sincerely carried out the field surveys in difficult terrains and field conditions (Since the list is very exhaustive it is

appended in Annexure-III). Help of Sh. Tarun Malhotra and Sh. Ratan Ghimirey from NIMR Field station, Haridwar is thankfully acknowledged. Assistance of Sh. P.N. Pattanayak, STO, Sh. Anoop Rawal, Sh. Naveen Gupta , Sh. Rahul Verma and Smt. Geeta Sagar, NVBDCP is also thankfully acknowledged.

I wish to acknowledge my sincere thanks to Dr. M.S. Malhotra, Deputy Director and Dr. Neena Valecha, Deputy Director (SG), NIMR, Delhi for Coordinating, planning and executing the surveys, analyzing the data and preparing the report.

Last, but not the least, all the co-operation and help received from the communities and household members of the survey villages are gratefully acknowledged. I also acknowledge the help and services received from several individuals in all five states and Delhi.

Prof. A.P. Dash,

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Abbreviations and Acronyms

API	Annual Parasite Index
DDC	Drug Distribution Centre
DDT	Dichloro diphenyl trichloroethane
FTD	Fever Treatment Depot
GOI	Government of India
ICMR	Indian Council of Medical Research
IDR	In-Depth Review
IEC	Information, Education and Communication
IRS	Indoor Residual Spraying
ITN	Insecticide Treated (bed) Nets
MPO	Modified Plan of Operation
NIMR	National Institute of Malaria Research
NMCP	National Malaria Control Programme
NMEP	National Malaria Eradication Programme
NVBDCP	National Vector Borne Disease Control Programme
MIS	Malaria Indicator Survey
<i>Pf</i>	<i>Plasmodium falciparum</i>
PHC	Primary Health Centre
<i>Pv</i>	<i>Plasmodium vivax</i>
RDK	Rapid Diagnostic Kit
VBD	Vector-borne disease

Executive Summary

Vector borne diseases in India continue to be a public health challenge. Efforts made in the past for the control of vector borne diseases have been impressive and the government has been expending substantial resources for this purpose. Support has been provided by several partners but in the past the control/elimination programmes have been vertical.

India has decided to effectively control malaria and Japanese encephalitis, eliminate kala azar and lymphatic filariasis and reverse the rising trend of dengue, chikungunia and other emerging vector borne diseases. The existing programmes have been integrated as vector borne disease control programme (VBDCP). This is proposed to be implemented as a part of National Rural Health Mission (NRHM) in collaboration with Integrated Disease Surveillance Programme (IDSP)

Plans are being developed for implementation of VBDCP for the next five years as a part of the 11th five year plan. The Directorate has decided to focus on policy development, programme coordination and intensify monitoring, evaluation and operational research to guide the implementation of the strategies. An in-depth review in the form of Joint Monitoring Mission (JMM) is proposed in January 2007. Important studies have been carried out for institutional assessment, environmental safeguards, procurement and financial management plans have been developed in conformity with NRHM guidelines. Many reports and studies will be made available for review by JMM. The members of the mission also propose to visit different states, districts and PHCs to observe and discuss the strategic issues related to the control of Vector Borne Diseases.

As a part of in-depth review process, GOI decided to undertake country-wide health facility and household surveys for the vector borne diseases. For malaria, the thrust of the surveys was to determine the participation of the community in prevention of malaria and care seeking pattern through household survey and assess the quality of preventive and curative services provided for malaria and assess the capacity of the health facilities and health care providers at different levels in the government and private sectors. National Institute for Malaria Research was requested to do these surveys.

The planning for the household and health facility surveys was initiated in May 2006 and the objectives of the proposed surveys were discussed and finalized. Through several consultations, and based on the objectives of the survey, key questions were identified and questionnaires were developed. Several consultations were organized jointly by VBDCP and NIMR to guide NIMR to plan the surveys, decide the sampling framework and sample size, and the domains in which the surveys were to be carried out. Malaria indicator survey instruments were reviewed and consultations were held with WHO for technical guidance.

Very tight time frameworks were given and the surveys including the submission of the report was expected to be completed within 3 months. Although the surveys were proposed to be conducted in September-October i.e in the peak of transmission season, these were delayed due to logistics and financial constraints. The surveys were carried out in 5 states representing different malaria ecotypes comprising of desert malaria, tribal malaria, forest malaria and urban malaria. In each domain the selection was based on malariometric indices and the sampling was purposive to include 3 high malaria incidence districts, 6 PHCs and 5 villages in each PHC. In each village at least 40 households were investigated. The sample size was at least 1200 households in each domain. For the health facility surveys a total of 50 health facilities

representing large hospitals, PHCs, subcenters and intermediate facilities in the government and private sectors were included. The ratio of government to private health facilities was about 4:1.

A three day training of the trainers (2 from each domain) was organized by NIMR in Delhi and the protocols were revised after a field visit which was a part of the training. Logistics and other plans for implementation were also developed. Each domain had a coordinator who selected district coordinators and supervisors in consultation with district health authorities. After this, the surveyors were selected. Training was conducted for the supervisors and the surveyors and this was soon followed by the surveys.

While the surveys were in progress, based on the key questions dummy tables were prepared and these were shared with the survey coordinators. The inputs were made for selected PHCs in each domain to ensure that the tables are consistent with the questionnaire and provide answers to the key questions raised. A methodology was also developed to ensure correct entry of the data. This included checking the internal consistency.

The staff from NIMR and WHO consultants visited survey districts in four domains. Supervision of the survey was thorough and throughout the survey quality checks were applied and mistakes of the surveyors corrected promptly by the supervisors. Each form filled at the end of the day was reviewed by the survey supervisors and inconsistencies, if any, were removed. The analysis of the survey was also cross-checked on a sample basis.

Key findings

Household survey

Household survey showed two weeks fever prevalence to vary between 1.5 and 4.2% with maximum prevalence reported from Chennai (urban area). The fever prevalence rate was higher in children under five years age but not higher amongst pregnant women as compared to average of all age groups.

Blood examination for fever was done in 27-82.2% cases being lowest in Chennai and highest in Rajasthan. The blood examination was performed within one day of occurrence of fever in 11.8-55.4% cases in the 5 states. Results of blood test done were available on the same day in 23.5-79.9% cases. No results were yet available in 11.6-45.1% cases.

The treatment for fever was obtained from government or private sector. The range in treatment seeking from the government was 15.2% (Chennai)- 65.1% (Assam). In the private sector the range was 24.4% (Assam)- 76.2% (Chennai).

The percentage of fever cases received treatment on same day/1 day varied between 3 – 94%.

Fever prevalence on the day of survey in 5 domains varied from 0.5 – 2.6%. Examination by RDTs and blood smear revealed that *P. falciparum* was dominant i.e 142 Pf cases out of a total of 157 cases of malaria. More than 90% of malaria cases were *P. falciparum*. In Maharashtra, out of 89 fever cases 37 were positive for malaria and all were detected as *P. falciparum* (SPR & SfR = 41.5%). In Orissa and Assam also the situation was similar with predominant *P.falciparum* infection.

This could have been higher if the survey was done during the malaria transmission season. The highest prevalence of fever and malaria was in Assam while the lowest prevalence was in Chennai.

Even though the survey was carried out when it was not the peak transmission season, in the domains studied (except for Chennai) malaria was the cause of fever in more than one third of the fever cases. This is related to the selection of the domains that are high risk for *P. falciparum* malaria.

In the prevention of malaria, two rounds of Indoor Residual Spray were reported by 2 – 91% of the households investigated. The IRS was assessed to be complete and uniform in 1.2 – 17% of the households where at least one round had been done. The survey did not evaluate the content of the insecticide.

The ownership and use of mosquito bed nets was high in Assam (88.2 %) and low in Maharashtra (19.1%) while it was negligible in Rajasthan and Chennai. The use of bed nets during the previous night by children under five years age and by pregnant women was higher than amongst other age groups. The treatment of nets within 6 months of the survey varied between 0.9% and 20.6%. Thus in vast majority of households, the protection by insecticide treatment was not substantial even though some protection may have occurred by the use of nets.

Health facility survey

The health facility surveys have shown the availability of first line antimalaria drug (chloroquine) recommended to date by the national policy. The availability of chloroquine tablets in the government facilities was higher than in the private facilities. The availability of artemisinin was comparable in the government and the private sector (10-about 30%). IV solutions and drugs used for hospitalized patients were available in the large health facilities.

Microscopes and RDKs were available in the large facilities. However, RDKs which should be available in the peripheral health facilities were in short supply or not available. A higher proportion of facilities in the government sector were able to do the laboratory diagnosis of malaria as compared to the facilities in the private sector.

The availability of the insecticides and the nets was low in most of the facilities visited. The insecticide was out of stock since the survey was carried out in the months when IRS was not done. However the insecticide for the re-treatment of the nets should have been available in stocks at least in the public health facilities.

Large hospitals were well staffed though the ratio of doctors to nurses was far from satisfactory. Large proportion of the staff in the facilities had not been trained in malaria during the past one year. The exceptions were the staff at the PHCs and in malaria clinics. The training of staff in the private sector was almost non existent.

The knowledge of vectors, insecticide resistance and drug resistance was poor. However the knowledge of prevention of malaria did exist in some PHCs and malaria clinics.

The IEC and health education materials were not available in large number of facilities except PHCs and malaria clinics.

The record keeping and surveillance activities were poorly done by the peripheral staff and the records were poorly maintained in the; large facilities where the staff were not interested in surveillance of malaria. They were also not aware of malaria outbreaks and the ensuing dangers. There was little evidence of preparedness for response to malaria outbreaks.

Recommendations

1. The guidelines, tools and survey questionnaires developed should be consolidated and refined so that these can be used in future health facility and household surveys.
2. The data should be further analysed to determine the quality of diagnosis and treatment of malaria in health facilities and the understanding of the patients determined from the exit interview
3. The findings of the surveys should be used for policy development and programme coordination including public private partnership
4. The findings of health facility survey should be used to strengthen the application of supportive strategies
5. The programme should use the methodology and approach used in periodic surveys as a part of monitoring and evaluation framework for assessing the outputs of the programme
6. The key findings of the health facility and household survey should be used to refine the strategies in the programme
7. In view of the substantial utilization of the private sector the VBDCP should develop sustainable partnerships to ensure application of uniform standards in the prevention and control of malaria
8. The information available from the household and health facility surveys should be used as benchmark to assess the programme performance

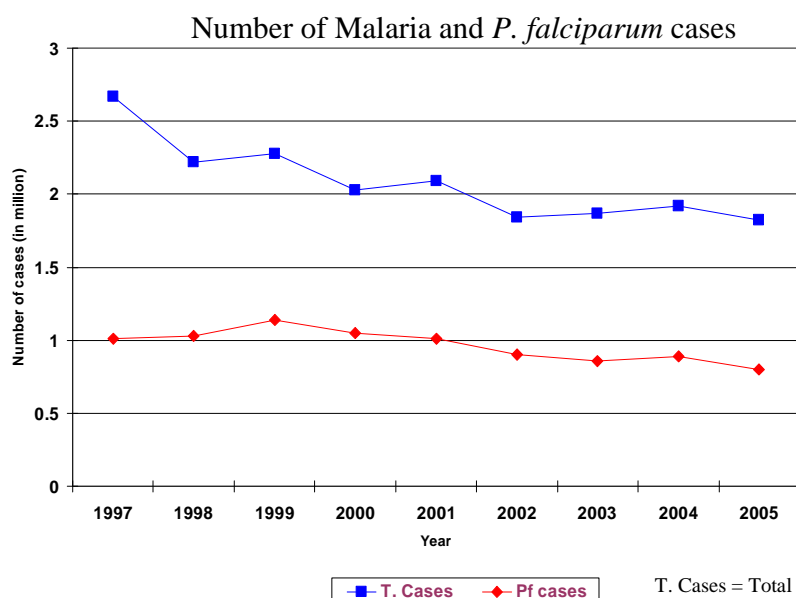
REPORT

Household and Health Facility Malaria Surveys for In-Depth Review of NVBDCP (Malaria)

1. Introduction:

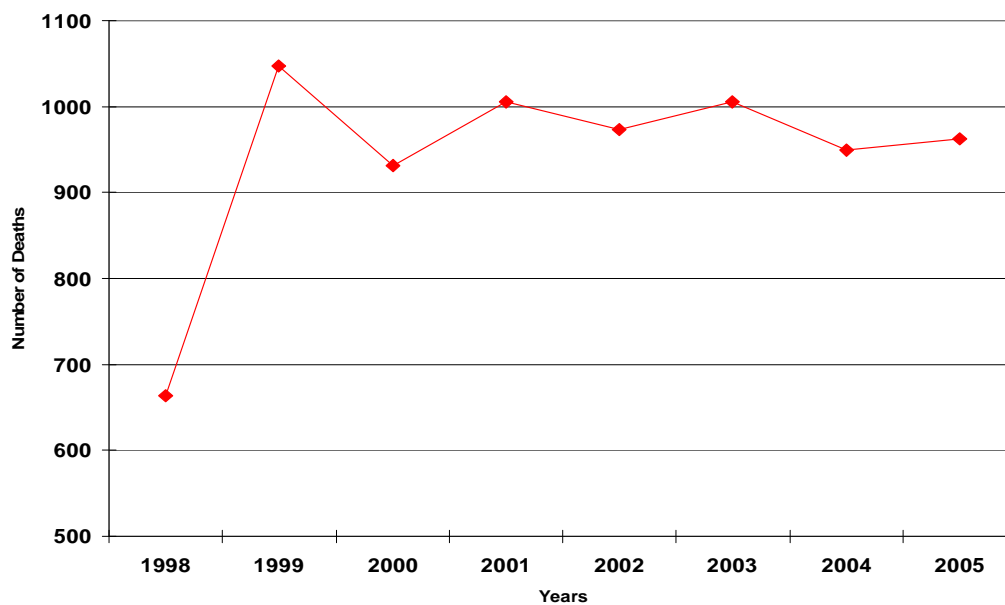
Among the vector-borne diseases (VBDs), malaria continues to pose a major public health threat in different parts of the country, particularly due to *Plasmodium falciparum* (Pf) which is prone to complications if not treated early. About 95% of the population lives in malaria endemic areas while 80% of the malaria burden is confined to 20% of the population in high risk areas. At the time of India's independence in 1947, there were an estimated 75 million malaria cases and 0.8 million deaths annually. The Government of India (GOI) launched the National Malaria Control Programme (NMCP) in 1953. The use of DDT resulted in a sharp decline of malaria in all areas where it was sprayed. In 1958, the GOI converted the NMCP into the National Malaria Eradication Programme (NMEP). The strategy of the NMEP was highly successful and the cases were reduced to about 100,000 and recorded deaths due to malaria were nil by 1965-66. Subsequently, several constraints led to a countrywide increase in the number of cases. By 1976 about 6.47 million malaria cases were reported, the highest since the resurgence of malaria. In 1977, the Modified Plan of Operation (MPO) was launched with the immediate objectives of preventing deaths and to reduce morbidity due to malaria. The programme was integrated with the primary health care delivery system. The blanket approach of insecticidal spraying was changed to selective indoor residual spraying by stratifying areas based on the Annual Parasite Incidence (API) of 2 and above. The number of cases reduced subsequently from 6.47 million in 1976 to 1.91 million in 2004. Of these, 0.89 million cases were caused by *P. falciparum* (figure-1).

Fig. 1 Malaria Situation in India (1997 - 2005)



The current strategies for malaria control are: (i) Early diagnosis and complete treatment, (ii) Integrated vector management by use of Indoor Residual Spraying (IRS) in selected high risk pockets, insecticide treated bed nets (ITNs), larvivorous fish, environmental and minor engineering methods, (iii) Epidemic preparedness and rapid response, (iv) Behaviour Change Communication (BCC) for social mobilization, (v) Inter-sectoral convergence (vi) Capacity building by training, (vii) Monitoring and evaluation through computerized Management Information System and periodic programme reviews. To maximize the outcomes in terms of adequate coverage and access to malaria control services, a strategy-mix is recommended under the programme. An integrated approach to malaria control is being implemented by the states and districts.

Fig. 2 Number of reported Deaths due to Malaria in India



With 1.8 million cases and 968 deaths having been reported in 2005 (Figure 2), it is felt that the number of cases and deaths is high and could be reduced further. The operational and technical constraints hampering optimal implementation of strategies and use of resources would need to be identified and addressed. In this regard, in 2006 it was decided to carry out an in-depth review (IDR) of the malaria programme to cover all aspects of the programme and provide data for future planning. The IDR was conceived to have several components. The first component was to carry out a rapid survey at health facility and household level to get first hand information on the operational challenges facing providers at implementation level and on client health seeking behaviour. The results from the survey and a few focused studies and reviews would feed into the second component which is to assemble a team of international and national experts (IDR team) to review the available information and advise the National malaria programme on how best to improve policy and operations to meet the current and future challenges. The IDR team would also consult other existing sources of information such as routinely collected data and reports from other surveys and studies in order to get as comprehensive a picture of the situation as possible. The IDR team is also expected to visit selected states, districts, PHCs and villages to observe the programme implementation and seek clarifications, explanations and seek suggestions

at different levels of the health system. The IDR would review all the information in the light of recent advances in malaria control and recommend changes in policies, strategies and operations in the National malaria control programme.

Several evaluations of the programme have been carried out in the past. However none of them have been exhaustive. The studies have not been conducted in several different domains of the country simultaneously. The surveys and evaluations carried out in the past are referred to in Annexure IV.

This report presents the findings and key issues identified from the **household and health facility surveys on malaria**. The household and health facility surveys will serve as a benchmark to assess the impact of strategic interventions proposed by the programme during the next five years. The methodology developed while conducting the surveys will be useful in using similar approach in future surveys. The household and health facility surveys were carried out in 5 states in India to represent 5 different ecological situations.

2. Objectives of the surveys

2.1 Overall objective

The overall objective of the surveys was to find out the current status and operational challenges facing the malaria control programme at health facility and community level. Accordingly, the survey had a health facility and a community component.

2.2 Specific objectives

2.2.1 Household survey

The specific objectives of the household survey were to find out:

- Household ownership of mosquito bed nets
- Use of bed nets among the households surveyed, particularly by pregnant women and children under five years age
- Two-week prevalence rate of fever
- Prevalence of fever on the day of survey
- Promptness of treatment for fever, especially for children under five years age and pregnant women
- Coverage of indoor residual spraying (IRS)
- Health seeking behaviour, particularly sources of treatment for fever

2.2.2 Health facility survey

For the health facility survey, the specific objectives were to find out:

- Resource availability at the health facility level, particularly:
 - Staff (e.g clinical, laboratory and field staff)
 - Drugs and supplies
 - Equipment – microscopes and Rapid Diagnostic Kits (RDKs)
 - IEC materials for public education

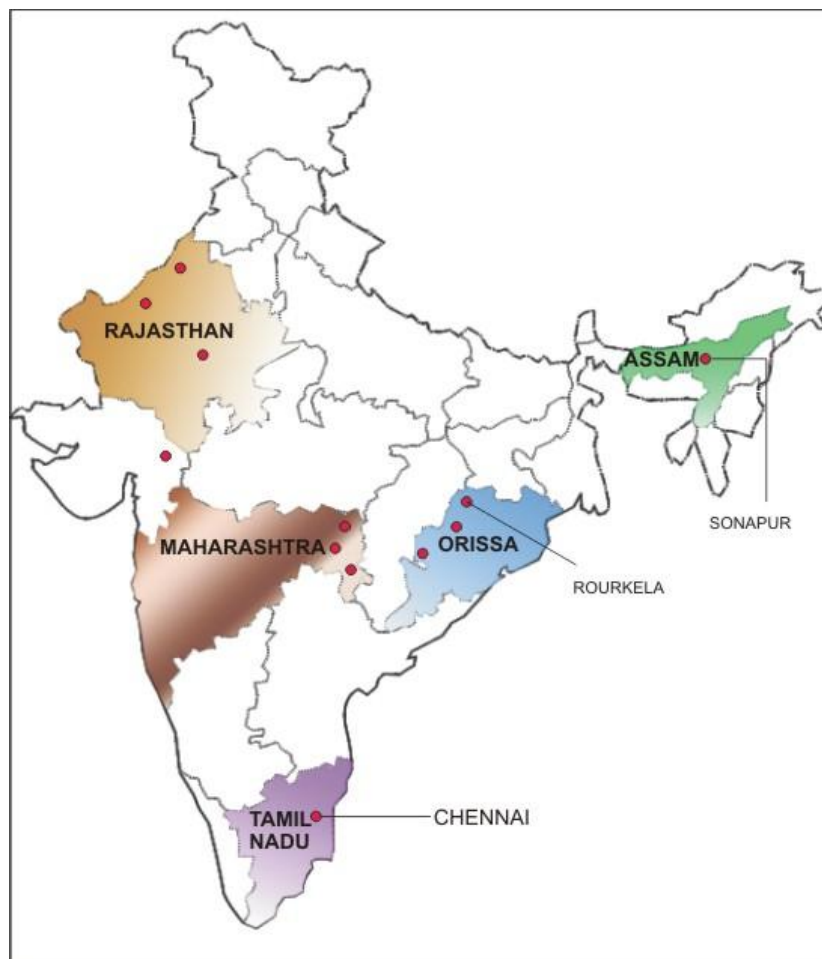
- Guidelines and job aids for health workers e.g malaria case management guidelines.
- ITNs
- Training of staff and supervision of malaria activities
- Availability and functioning of DDCs and FTDs
- IEC and Community mobilization activities
- Knowledge of monitoring of drug and insecticide sensitivity
- Surveillance and Epidemic Preparedness activities

3 Methodology of Surveys

Location of the survey domains

The survey was carried out in the states of Assam, Maharashtra, Orissa and Rajasthan and the city of Chennai (Tamil Nadu) (Figure-3).

Figure-3 Surveys in 5 states of India:



Orissa, Assam, Maharashtra, Rajasthan and Chennai (Urban)

HIGH INCIDENCE DISTRICTS / ZONES IN EACH STATE

State/ S. No.	Districts	Population (000's)	Average of last 3 years (2003, 04, 05)		Total Deaths (2003, 04, 05)
			API	ABER	
ORISSA					
1.	Nuapada	1080	35.5	11.1	29
2.	Sundergarh	1925	25.6	25.3	70
3.	Sambalpur	968	22.6	16.9	30
ASSAM					
1.	Karbi Anglong	832	16.1	21.1	85
3.	Darrang	1663	5.8	6.0	8
3.	Goalpara	860	3.9	7.3	1
RAJASTHAN					
1.	Jaisalmer	508	23.6	33.7	7
2.	Barmer	1964	10.25	22.3	5
3.	Bikaner	2093	3.82	15.7	14
MAHARASHTRA					
1.	Gadchiroli	1043	16.7	67.4	30
2.	Gondia	1246	1.9	49.6	43
3.	Chandrapur	2200	1.68	30.8	7

CHENNAI (City Corporation)

S. No.	Zones	Population	Average of last 3 years (2003, 04, 05)		Deaths
			API	ABER	
1.	Zone –II	510800	12.9	22.1	
2.	Zone –III	598800	7.6	10	
3.	Zone –X	438200	7.46	5.45	

3.1 Dates of Survey

There was a full time person assigned to coordinate all the activities and ensure that they are carried out on schedule. While the initial aim was to carry out the surveys during the peak of malaria transmission season i.e. September/October 2006 due to logistical and budgetary constraints it was carried out during November/December 2006.

The following time schedule for preparation, trainings, surveys and data compilation and analysis was followed:

Timetable for the Review

Activity	Time-Frame
Agree on objectives and methodology and finalize the survey protocol	1 week
Design data collection instruments	1 week
Circulate the instruments to other knowledgeable people for comments	1 week
Revise data collection instruments	1 week
Train supervisors and pre-test data collection tools	3 days
Revise, finalize and print data collection tools	3 days
Training of state/districts coordinators & field supervisors and interviewers,	3 days
Field data collection (health facility and household components)	20 days
Data entry	1 week
Data cleaning and analysis	1 week
Report writing	1 week
Circulation of draft report and receive comments	1 week
Revision and finalization of draft report	3 days
Meeting to discuss draft report and recommendations	2 days
Finalization of report and handover to NVBDCP	1 week
Total time required	14 weeks

3.2 Survey tools

One questionnaire each was designed for the household and community components. Each questionnaire had sub-components to capture the data for the objectives of the surveys (see Annex 1 and Annex 2). The questionnaires were pre-tested during the training of survey coordinators and refined after the pre-testing.

3.3 Sampling and Sample Size

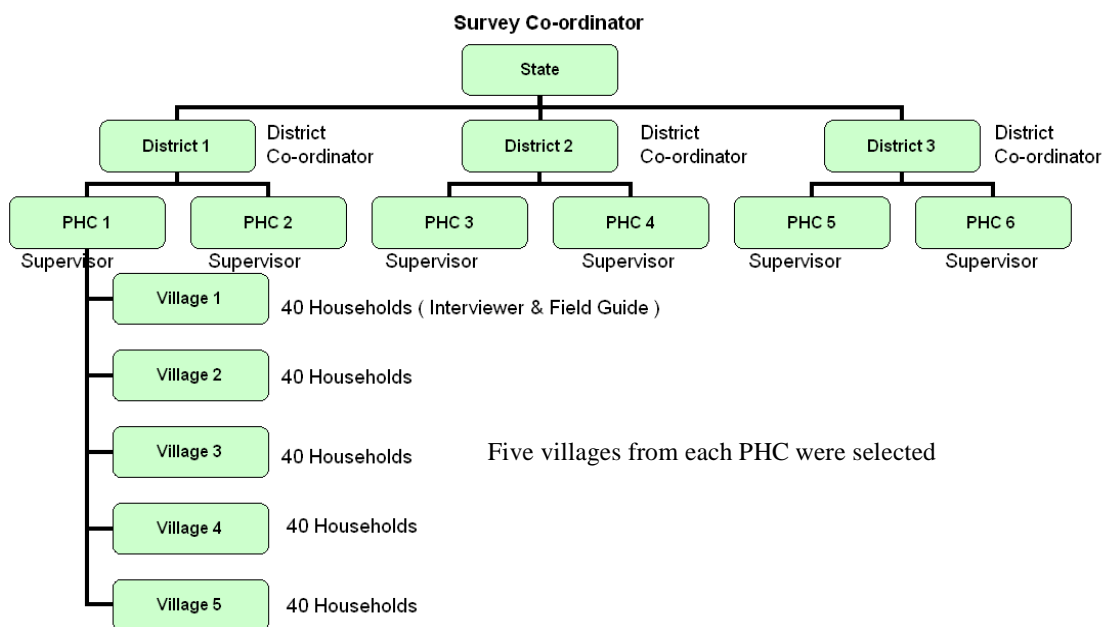
The survey was designed to be able to gather useful information on the key issues identified in the objectives as rapidly as possible, in order to be able to feed into the IDR. While the WHO malaria indicator survey (MIS) sampling method was initially considered for the household component of the survey, it was dropped because of the time and logistical constraints. Timelines for the Joint Monitoring Mission had to be met. Getting a full listing of all the households from which to draw the sample of households to be surveyed was going to be too time consuming and expensive for the purposes for which this survey was designed. Malaria transmission varies by ecological regions in India. It was decided to select representative domains in different states of the country. The states selected for the survey represent desert malaria, urban malaria, forest malaria, and tribal malaria. The states and city that were surveyed were deliberately chosen to be high-risk malaria areas. Rajasthan represents a desert region, Maharashtra represents high capacity state (the districts selected were in forested areas), Chennai represents

urban malaria, Orissa is a hilly and forested region while Assam is a highly malaria endemic region.

Because the primary interest was to get information on the high malaria transmission areas, the three highest malaria incidence districts/zones were selected in each state/city based on the annual parasite incidence (API) for the previous three years. In each district the highest and lowest malaria incidence Primary Health Centres (PHC) were selected, again based on API for the previous three years. Other criteria considered were SPR, ABER and deaths due to malaria.

In each domain, the representative population selected for the survey was chosen by including 3 districts, 6 Primary Health Centres and 5 villages in each PHC/division (Figure-4). The number of households surveyed in each domain was at least 1200. This number was considered as adequate for getting the information required for the survey. This figure would also provide information on children under the age of five years but was not expected to enumerate adequate number of pregnant women. Therefore it was decided to select households where there were pregnant women first purposively and after completing the quota in each village, the surveyors were advised to complete the survey in the remaining households in the village. The selection of the household was done without any bias to make sure that all caste groups in the village have an equal chance of being covered by the survey.

Figure-4 Framework of Household Survey in each domain



For the household component of the survey, in the rural areas five villages were randomly selected per PHC while in the urban area all the streets in a division were surveyed. In each village/street, 40 households were interviewed, for a total of 200 households per PHC/division, 400 per district/zone and 1200 households per state/city.

For the health facility survey, five facilities were randomly selected per PHC to represent the different providers (e.g government, NGO, private sector, etc.) and types (e.g hospital with beds, sub-centre facility, clinic, etc.) of health facilities/services, for a total of ten per district and thirty health facilities per state/city (domain).

3.4 Management of the Survey

3.4.1 Coordination and funding

The study was organized and coordinated by the National Institute of Malaria Research (NIMR) of the Indian Council of Medical Research (ICMR). Most of the funding for the survey was provided by the Government of India, with additional funding coming from the World Bank and WHO. Funds were utilized mainly for the following heads:

- | | |
|--|------------------------------|
| a) Preparatory work | b) Training |
| c) Consultation | d) Field work |
| e) Data entry, analysis and report writing | f) Dissemination of findings |
| g) Travel and POL | h) Daily allowances |
| i) Computer stationary etc. | |

3.4.2 Personnel, Training and Data Collection

In each state/city the survey was coordinated by personnel from the NIMR. Field interviewers/surveyors were hired mostly locally in each state/city (see Annex 3 for the list of personnel involved).

Two teams of two people each carried out the field interviews in each state. Each survey team was accompanied by a local guide. One person in each team asked the questions while the other wrote the responses. Care was also taken to ensure that each team was composed of people who spoke the local languages. A supervisor was assigned to each district, who was to check the quality and consistency of the collected data. If there were inconsistencies or missing information, it was the duty of the field supervisor to ensure that they were rectified before the team left the field. The supervisor provided on the site training by identifying and solving problems of the surveyor.

Cascaded training was carried out. Trainers who were going to train the field interviewers in each state/city were trained in Delhi in September 2006. Part of their training included pre-testing of the questionnaires in some villages around Delhi, which were then revised. A session was held with them to update them on the revisions incorporated after the pre-testing of tools. During the training of the trainers, the logistics arrangements and detailed planning of the survey were also undertaken. The state/city trainers in their turn trained the field interviewers over a period of 3 days in their state/city in November. One day was spent in going through the questionnaires, one day in field work for them to get familiar with interviewing techniques and the last day was for correcting any issues noticed during the field work. The last day was also utilized to develop the survey plan and make the logistics arrangements.

The data collection was carried out over three weeks in each state/city. Some of the field observations which could be useful for future surveys are recounted in sub-section 3.6 below (Observations from the Field).

Quality Assurance of surveys, data compilation and analysis were ensured by the following actions:

- Organized hands on training at NIMR, Delhi and district levels
- Mock surveys were carried out and the review of the surveys done.
- Two teams from centre Delhi visited the states of Rajasthan, Assam, Chennai and Orissa to personally supervise the quality of surveys and data compilation. The information collected in questionnaires was cross-checked and verified.
- Survey supervisors interviewed about 10% of households independently to ascertain consistency and quality. The feedback was given to the interviewers/surveyors constantly.
- At the end of the day each questionnaire filled up by the interviewers was scrutinized by the respective supervisors.
- Field collected information received from districts was independently compiled and analyzed to ensure comparability.

3.4.3 Data Entry and Analysis

Before data entry and analysis, field survey tools of one PHC each from each state was selected randomly. Data collected in the questionnaire was tallied with the compiled data in tabulation forms to cross-check and ascertain quality.

Each survey form was checked to ensure consistency of data. Any inconsistencies were corrected on a daily basis.

In order to speed up data analysis and to provide the report in a timely manner so that it would feed into the main in-depth review that was scheduled for January 2006, data analysis for the household component of the survey was carried out manually in each state. Each state/city was given the set of dummy output tables which formed the basis for the analysis. Each state summarized the data according to the district surveyed. The summary tables from the states were then manually consolidated at national level to produce the final tables for the household component, which form the basis of this report. At national level, a re-analysis of the original questionnaires from one district per state was carried out, as a means of verifying and cross-checking the analysis carried out in the states.

The health facility data was entered into the computer programme Epi-Info 2000. The output tables were produced using this computer programme.

3.5 Ethical considerations

- Care was taken that all the proceedings (questions and replies) during household surveys are kept confidential. The respondents were assured that confidentiality would be maintained.
- While undertaking household survey, the fever prevalence on the day of survey was also investigated. For this observation, there was also a need to know whether the fever was due to malaria. Hence, the household head/patient was told that this fever could be malaria and whether he consents to get the patients blood tested on the spot with immediate results through Rapid Diagnostic Test Kits (RDTs) and patients

would be treated immediately. The household head/ patients usually readily consented to the procedure because of the benefit accruing from immediate report and treatment.

- The respondents were told that the blood would not be tested if they do not consent to the procedure. However, there was no refusal.
- Blood testing was done by using a disposable lancet and all aseptic precautions were observed to reduce the risk of infections particularly HIV, Hepatitis B and other blood borne infections.

3.6 Observations from the Field

The following are some of the observations which could be useful for the conduct of future surveys.

a) Training and need to use field guidelines:

Perhaps three days training was inadequate for the interviewers to fully grasp the concepts and meaning of the questions being asked. In future it would be useful to have more time to go through each question and fully discuss it with the interviewers. Perhaps five full days should be the minimum for training, three days for going through the questionnaires, one day for field experience cum pre-testing of tools and one day for wrap up, and planning the logistics of the survey.

To ensure standardization in the way questions are asked, it would also be useful to train all the supervisors for all the states/domains in one centralized place such as in Delhi. The field personnel were not always using the field guidelines to resolve issues encountered in the field even though this was provided. Survey supervisors reminded the surveyors to consult the field guide as frequently as needed.

b) Supervision

Cross-checking of the completed questionnaires at the end of each day for inconsistencies and completeness was not always done. The field guide should include procedures for follow up and supervision.

Commonly encountered problems, reasons for the problems and possible solutions should also be included in the field guide. This would help solve at least the commonly encountered problems and prevent the surveyors from making these mistakes.

c) Village structure and sampling

It was observed that the rural village structure was not homogenous, with each village made up of a main village and several hamlets attached to it. For most of the big villages, all the 40 households could be obtained from the main village. Unless careful consideration of this village structure is taken into account in the sampling and selection of households, the hamlets might not be represented in the final data that is collected.

The field guide should have a section to help the surveyors select and investigate the households so that they are representative of all sections of the community.

In the urban area, the observation was that several households live in one multi-storey building. Depending on the number of households required, one or two buildings could easily account for all the households, which might not be representative. Any sampling scheme would need to be cognizant of this fact. An effort should be made to select representative population in the urban wards.

d) De-centralised sampling

It would be useful to select all the villages and health facilities at central level in Delhi. Getting the full list of villages and health facilities from which to draw the random sample should be part of the survey preparatory procedures

The method for decentralized sampling should be described in the field guide and the district census should be used for sampling the population to be surveyed. .

e) Need for updating the questionnaires

Problems were noted in the use of the questionnaires, and they will need to be updated for any future surveys. For example, the coded responses for some of the questions were not always exhaustive, particularly the lack of a “not applicable” or “do not know” response.

f) Use of API as indicator of endemicity

Some teams observed that they seemed to be getting more fever cases in the low API PHCs than in the high API PHCs. There may be need to validate the APIs through a community survey of parasitaemia.

g) Summary of observations of the field visits

- In Orissa, re-impregnation of bed nets was not undertaken in time. In Maharashtra, due to lack of information, many villagers washed their bed nets within 1-2 months of re-impregnation.
- Indoor Residual Spraying in most of the houses in Orissa was found to be patchy and incomplete due mainly to lack of supervision.
- All the pregnant women surveyed in Orissa and Maharashtra are being given chemoprophylaxis through Anganwadi Centres and ANMs. This is a positive point.
- Field visits by supervisory staff was found to be poor in Orissa. This feedback was given to the survey teams.
- In Maharashtra, spraying insecticide could not be evaluated properly in several places either due to the fact that synthetic pyrethroids were less visible or because most of the households were whitewashed after spraying was done, during recent festival season.
- Treated bed nets were supplied to PHCs and hospitals for indoor patients in all 3 districts of Maharashtra which is appreciated.
- In Orissa, maintenance of the microscopes was found to be unsatisfactory.
- Sufficient Rapid Diagnostic Kits are not supplied to the rural as well as urban areas.
- Most of the remote communities depend on the quacks rather than government health facility due to poor transportation. The quacks are not following the national drug policy for the treatment of the malaria positive cases.
- Private practitioners are also not following the national drug policy. The first line of treatment of the malaria positive cases by the private practitioners varies.
- Some of the hospitals do not have the microscopy facility

3.7 Limitations

While the survey endeavoured to represent most of malaria ecological zones in India, within a state/city only the high incidence districts were selected. The findings may therefore not be applicable to the low incidence districts.

Though the training of the district coordinators was initiated much earlier, but due to resource constraints (late budgetary allocation), the actual field surveys could not be started during peak malaria transmission season. This resulted in low fever malaria prevalence and it was not possible to investigate more number of fever cases/malaria cases. In future surveys it is important to organize training just before initiating the survey so that the surveyors and supervisors do not forget the content of training and remain motivated.

There was a lag time between the training of the survey coordinators and the district survey teams. This was because of the delay in the release of funds and other logistic constraints. Efforts were made to keep the motivation and involvement of the coordinators through ongoing communication and through their involvement to work out the logistics and undertake translation of the training material and print the survey forms.

4. Findings

It was felt that there were two primary audiences for the report. The first audience are programme managers who may be primarily interested in the level of performance of the programme, and who would, therefore, be interested in the detailed findings for each objective of the survey. The second audience comprises policy makers who, in addition to a summary of the findings, would perhaps be more interested in the key issues which need to be addressed. In order to cater for both audiences, the body of the report has been divided into two main sections i.e a section on findings and a separate discussion section. The section on findings (Section 4) provides the detailed tables of results for each component of the survey, while a separate discussion section (Section 5) comments on the implications of the results for programme delivery and identifies the key issues which JMM will need to address.

The findings of the survey have been divided into two parts. The first part (Section 4.1) deals with the results of the **health facility survey**. The second part (Section 4.2) presents the findings from the **household component of the survey**. Both components of the survey were conducted in November/December 2006.

4.1 Findings of the Health Facility Survey

While interpreting the findings of the survey, the following points should be considered

- a) All the facilities surveyed are included in the denominator i.e missing values are included.
- c) The interpretation of the data will vary depending on how much data is missing and the difference between the two percentages.
- d) The important percentage to use is the row per cent (row %).

4.1.1 Types of Health Facilities surveyed

An effort was made to include a mixture of facilities available in the states/city surveyed in the survey, though has varied depending on what was available in each state/city. For example, there were no NGO-owned facilities in the districts surveyed in Assam, Orissa and Rajasthan, while there were no nursing homes in the districts/zones surveyed in Chennai, Maharashtra and Rajasthan. Predictably, almost all the pharmacies surveyed were in Chennai city.

Code	Assam	Chennai	Maharashtra	Orissa	Rajasthan	TOTAL
Govt Hosp with beds	4	4	7	9	3	27
Malaria Clinic	2	6	3	1	0	12
PHC	14	0	6	8	9	37
Sub-centre	2	0	8	3	12	25
Pvt Hosp with beds	0	7	4	2	3	16
Pvt Clinic	3	5	1	0	0	9
Nursing Home	2	0	0	1	0	3
NGO HF	0	1	1	0	0	2
Pharmacy/Medical stores	0	10	0	1	1	12
TOTAL	27	33	30	26	28	144

Except in Chennai the private health facilities investigated were about 20% of all the health facilities included in the survey. In the meeting of the survey coordinators in Delhi, it was agreed that the sampling of health facilities to be surveyed should represent about 20% of all the health facilities surveyed in the state.

4.1.2 Availability of Drugs

Availability of the first line anti-malaria drugs i.e. Chloroquine tablets and Primaquine was good in all states/city, except for Primaquine in Chennai where about one third of the facilities surveyed did not have Primaquine (Table 4.1.2a). Private clinics and private hospitals had less of the two drugs than public sector health facilities. Sulphadoxine-pyrimethamine (S-P), which is the first line drug in chloroquine resistant areas, was available in about one third of the facilities surveyed.

Quinine, arteether and artemisinin were much less available than the first line drugs, though quinine injection and arteether were more frequently available drugs amongst this group of drugs (Table 4.1.2b). Artemisinin and arteether were available more often in the large private health facilities than in the government and small private health facilities.

Paracetamol was available in most of health facilities as an anti-pyretic compared to aspirin, while diazepam (both tablets and injections) was available in only about one third of the facilities (Table 4.1.2c).

Availability of intravenous solutions (saline and dextrose) was good at the type of health facilities where they were most needed i.e. hospitals with beds.

Table 4.1.2a: Availability of antimalarials in health facilities					
	Total facilities Surveyed	Chloroquine tablets	Chloroquine injection*	Sulphadoxine-Pyrimethamine	Primaquine
		%	%	%	%
Assam	27	92.6	29.6	48.1	85.2
Chennai	33	84.8	42.4	33.3	69.7
Maharashtra	30	100	66.7	46.7	96.7
Orissa	26	88.5	30.8	34.6	84.6
Rajasthan	28	92.9	10.7	7.1	85.7
Type of Facility					
Govt Hosp with beds	27	96.3	44.4	33.3	85.2
Malaria Clinic	12	100	33.3	41.7	100.0
PHC	37	97.3	40.5	32.4	94.6
Sub-centre	25	100.0	4.0	16.0	100.0
Pvt Hosp with beds	16	81.3	68.8	25.0	68.8
Pvt Clinic	9	44.4	0.0	11.1	22.2
Nursing Home	3	33.3	33.3	33.3	33.3
NGO HF	2	100	50.0	50.0	50.0
Pharmacy/ Medicals	12	100	66.7	91.7	83.3
TOTAL	143	91.7	36.8	34.0	84.0

*Since chloroquine injection is not recommended under the programme, therefore, non availability may not be considered as deficiency.

Table 4.1.2b. Stock of antimalarials in health facilities on the day of survey					
	Total facilities Surveyed	Quinine tablets	Quinine injection	Arteether injection	Artemisinin
		%	%	%	%
State/City					
Assam	27	18.5	40.7	33.3	18.5
Chennai	33	0.0	27.3	42.4	6.1
Maharashtra	30	3.3	76.7	53.3	10.0
Orissa	26	15.4	57.7	46.2	30.8
Rajasthan	28	0.0	21.4	21.4	0.0
Type of Facility					
Govt Hosp with beds	27	11.1	63.0	44.4	11.1
Malaria Clinic	12	0.0	41.7	50.0	25.0
PHC	37	16.2	54.1	48.6	10.8
Sub-centre	25	0.0	20.0	4.0	4.0
Pvt Hosp with beds	16	6.3	43.8	50.0	12.5
Pvt Clinic	9	0.0	33.3	11.1	11.1
Nursing Home	3	0.0	33.3	33.3	33.3
NGO HF	2	0.0	50.0	50.0	50.0
Pharmacy/ Medicals	12	0.0	33.3	66.7	16.7
TOTAL	143	6.9	44.4	39.6	12.5

Table 4.1.2c. Availability of anti-pyretics and anti-convulsants in health facilities					
	Total facilities Surveyed	Paracetamol	Aspirin	Diazepam Injection	Diazepam Tablets
		%	%	%	%
State/City					
Assam	27	100.0	44.4	22.2	14.8
Chennai	33	84.8	66.7	45.5	66.7
Maharashtra	30	100.0	76.7	53.3	40.0
Orissa	26	73.1	30.8	46.2	19.2
Rajasthan	28	89.3	10.7	14.3	32.1
Type of Facility					
Govt Hosp with beds	27	96.3	51.9	66.7	51.9
Malaria Clinic	12	91.7	25.0	8.3	33.3
PHC	37	97.3	48.6	27.0	24.3
Sub-centre	25	88.0	24.0	8.0	4.0
Pvt Hosp with beds	16	81.3	56.3	68.8	62.5
Pvt Clinic	9	44.4	33.3	22.2	11.1
Nursing Home	3	66.7	66.7	66.7	66.7
NGO HF	2	100.0	100.0	100.0	100
Pharmacy/ Medicals	12	100.0	91.7	33.3	66.7
TOTAL	143	89.6	47.2	36.8	36.1

Table 4.1.2d : Availability of drugs in health facilities				
	Total facilities Surveyed	Anti-emetic	Iron tonic	Dopamine infusion
		%	%	%
State/City				
Assam	27	59.3	44.4	11.1
Chennai	33	84.8	78.8	36.4
Maharashtra	30	86.7	100.0	26.7
Orissa	26	69.2	3.8	19.2
Rajasthan	28	14.3	39.3	10.7
Type of Facility				
Govt Hosp with beds	27	81.5	44.4	40.7
Malaria Clinic	12	66.7	75.0	8.3
PHC	37	62.2	43.2	5.4
Sub-centre	25	28.0	52.0	0.0
Pvt Hosp with beds	16	81.3	75.0	62.5
Pvt Clinic	9	33.3	33.3	0.0
Nursing Home	3	66.7	66.7	66.7
NGO HF	2	100.0	100.0	100.0
Pharmacy/Medicals	12	91.7	91.7	16.7
TOTAL	143	63.9	55.6	21.5

Table 4.1.2e : Availability of fluids in health facilities				
	Total facilities Surveyed	Saline	Dextrose	
		%	%	
State/City				
Assam	27	88.9	81.5	
Chennai	33	60.6	60.6	
Maharashtra	30	83.3	80.0	
Orissa	26	69.2	69.2	
Rajasthan	28	32.1	46.4	
Type of Facility				
Govt Hosp with beds	27	88.9	88.9	
Malaria Clinic	12	16.7	16.7	
PHC	37	81.1	81.1	
Sub-centre	25	36.0	40.0	
Pvt Hosp with beds	16	81.3	81.3	
Pvt Clinic	9	44.4	44.4	
Nursing Home	3	66.7	66.7	
NGO HF	2	100.0	100.0	
Pharmacy/ Medicals	12	75.0	75.0	
TOTAL	143	66.7	67.4	

4.1.3 Availability of Equipments, training materials and Medical Supplies

Microscopes were available at the big health facilities in both the public and private sectors. RDT kits were less available at the smaller facilities (e.g Sub-centres) than at larger facilities (e.g govt/private hospital with beds and PHCs). Assam and Orissa had better availability than the other states/city, with Chennai having the lowest availability of both RDT kits and microscopes as well as slides and lancets, probably because a large proportion of the facilities were private pharmacies which do not diagnose malaria by laboratory tests.

Availability of training materials was quite low in all states/city, with Assam having the highest availability at 37% and Chennai/Rajasthan the lowest at 8 and 7% respectively. For Chennai, it is again perhaps because of high number of facilities were private pharmacies. When broken down by type of facilities, malaria clinics and PHCs had the highest availability (50% and 27%), probably because they were more involved in training. Surprisingly, large hospitals with beds had low availability of training materials, as were sub-centres.

In general the availability of insecticide and ITNs was low. Availability of insecticide (both for IRS and ITNs) was low, even at malaria clinics and PHCs. The low availability of insecticide is explained because at the time of the survey there was no plan for IRS. The lack of ITNs is probably due to inadequate supplies by the state and the VBDCP.

Table 4.1.3a : Availability of equipments in health facilities

	Total facilities Surveyed	Rapid Diagnostic Test Kits (RDT)	Microscope	Glass Slides	Stains	Lancets
		%	%	%	%	%
State/City						
Assam	27	59.3	81.5	96.3	85.2	96.3
Chennai	33	15.2	54.5	57.6	57.6	42.4
Maharashtra	30	23.3	56.7	86.7	53.3	86.7
Orissa	26	53.8	80.8	88.5	76.9	88.5
Rajasthan	28	53.6	60.7	89.3	57.1	35.7
Type of Facility						
Govt Hosp with beds	27	37.0	88.9	88.9	92.6	81.5
Malaria Clinic	12	41.7	91.7	100.0	100	100
PHC	37	54.1	86.5	91.9	83.8	78.4
Sub-centre	25	24.0	16.0	100.0	12.0	68.0
Pvt Hosp with beds	16	43.8	81.3	81.3	75.0	56.3
Pvt Clinic	9	33.3	44.4	44.4	44.4	44.4
Nursing Home	3	100	100.0	100.0	100	100.0
NGO HF	2	50.0	100.0	100.0	100	50.0
Pharmacy/ Medicals	12	8.3	8.3	8.3	8.3	8.3
TOTAL	143	39.6	66.0	82.6	65.3	68.8

Table 4.1.3b : Availability of other supplies in health facilities						
	Total facilities Surveyed	Disposable Syringes	Mosquito Nets (ITNs)	Insecticide to Treat Nets	Residual Insecticide	Training Materials
		%	%	%	%	%
State/City						
Assam	27	77.8	18.5	3.7	40.7	37.0
Chennai	33	36.4	3.0	0.0	0.0	6.1
Maharashtra	30	86.7	6.7	6.7	6.7	20.0
Orissa	26	80.8	7.7	15.4	23.1	19.2
Rajasthan	28	60.7	0.0	0.0	7.1	7.1
Type of Facility						
Govt Hosp with beds	27	85.2	7.4	3.7	11.1	11.1
Malaria Clinic	12	25.0	16.7	25.0	41.7	50.0
PHC	37	70.3	10.8	5.4	24.3	27.0
Sub-centre	25	68.0	4.0	0.0	4.0	4.0
Pvt Hosp with beds	16	100	0.0	0.0	0.0	6.3
Pvt Clinic	9	55.6	0.0	0.0	11.1	0.0
Nursing home	3	100.0	0.0	0.0	33.3	33.3
NGO HF	2	100	0.0	0.0	0.0	100
Pharmacy/ Medicals	12	8.3	0.0	0.0	0.0	0.0
TOTAL	143	67.4	6.9	4.9	14.6	17.4

4.1.4 Availability and Training of Staff

There is a huge difference in staff availability between the urban (Chennai) and rural areas, partly because that some of the facilities surveyed in Chennai were teaching hospitals (Stanley Medical College and Madras Medical College) (plus Voluntary Health Services- - Adyar Hospital an NGO) which accounted for most of the staff in Chennai. Within the rural areas, the ratio of doctors to nurses was almost one to one, which shows that there is shortage of nurses in the rural areas (Table 4.1.4a).

Almost none of the staff, in any staff category, had been trained on malaria in the year prior to the survey (Table 4.1.4a and Table 4.1.4b).

Table 4.1.4a : Mean number of staff members (per health facility) and numbers trained in malaria case management in last 1 year											
		Doctors		Midwives		Nurses		Community Health Worker		Laboratory Technician	
		Avail-able	Trained	Avail-able	Trained	Avail-able	Trained	Avail-able	Trained	Avail-able	Trained
State/City											
Assam	27	5.28	1.13	5.83	5.33	12.41	5.23	30.37	12.50	2.95	1.89
Chennai	33	32.83	0.00	3.04	0.00	63.25	0.00	0.04	0.00	4.29	0.00
Maharashtra	30	7.10	0.00	6.00	2.00	11.52	0.10	2.00	0.00	3.66	0.00
Orissa	26	7.26	0.0	4.83	2.42	9.35	0.35	3.00	0.71	3.50	0.00
Rajasthan	28	7.92	0.00	1.40	0.00	8.42	0.15	0.00	0.25	1.38	0.00
Type of facility											
Govt Hosp with beds	27	32.80	0.36	3.16	1.11	65.75	0.52	20.50	9.37	4.34	0.17
Malaria Clinic	12	3.00	0.00	0.00	0.00	3.57	0.00	0.00	0.00	3.88	0.11
PHC	37	2.05	.74	5.42	4.00	5.54	4.12	2.64	0.18	2.14	1.33
Sub-centre	25	1.50	0.00	1.83	0.00	1.83	0.30	0.0	0.0	1.33	0.66
Pvt Hosp with beds	16	16.07	0.00	6.33	0.18	36.69	0.00	0.11	0.00	5.58	0.00
Pvt Clinic	9	2.14	0.00	0.83	0.00	5.14	0.00	4.40	0.00	0.83	0.16
Nursing Home	3	5.33	0.33	2.00	0.00	9.33	0.33	0.0	0.0	1.50	0.50
NGO HF	2	55.50	0.00	11.00	0.00	31.00	0.00	0.00	0.00	6.50	0.00
Pharmacy/ Medicals	12	3.00	0.00	0.33	3.75	0.33	1.25	0.00	1.00	0.00	0.00

Table 4.1.4b : Number of Staff Members and Number Trained									
		Malaria Supervisor		MPW (Male)		MLV		FTDs	
		Avail-able	Trained	Avail-able	Trained	Avail-able	Trained	Avail-able	Trained
State/City									
Assam		2.27	.50	6.50	5.28	98.00	116.00	58.42	52.66
Chennai		0.08	0.00	2.66	0.00	0.00	0.00	0.00	0.00
Maharashtra		3.28	0.00	15.93	0.00	25.00	0.00	28.8	0.00
Orissa		5.60	0.00	14.91	0.00	97.16	19.83	76.83	1.66
Rajasthan		0.00	0.12	0.50	0.00	1.11	0.00	0.42	0.00
Type of facility									
Govt Hosp with beds		2.18	.37	9.00	.40	32.85	0.00	7.75	7.00
Malaria Clinic		2.62	0.00	26.25	0.00	0.00	0.00	16.50	0.00
PHC		1.38	.16	5.64	1.83	71.46	48.58	52.70	26.92
Sub-centre		1.00	0.00	1.27	0.00	0.00	0.00	3.0000	0.00
Pvt Hosp with beds		0.00	0.00	0.00	0.00	0.00	0.00	1.80	0.00
Pvt Clinic		1.20	0.00	0.00	0.00	0.40	0.00	0.00	0.00
Nursing Home		0	0	0	0	0	0	0	0
NGO HF		0.00	0.00	64.00	0.00	0.00	0.00	0.00	0.00
Pharmacy/ Medicals		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

4.1.5 Knowledge of Vector Control Activities

The knowledge of vector prevalence, insecticide resistance and vector control activities was very low in the government and private health facilities. This was overall less than one third in the facilities investigated.

A substantial proportion of those asked about knowledge of insecticide sensitivity studies either said they did not know or did not answer the question. One third of the respondents in malaria clinics, PHCs and sub-centres (33 to 36%) and 46% in the government hospitals with beds said they did not know about the studies on vector resistance (Table 4.1.5).

Knowledge of local prevalent vectors was also very low, ranging from 0% in government hospitals with beds to 8% and 17% in PHCs and malaria clinics (Table 4.1.5)

Procurement and distribution of ITNs was confined to malaria clinics, PHCs and government hospitals with beds. .

Only Maharashtra, Orissa and Rajasthan had some programme for larvivorous fish, with mostly malaria clinics, PHCs and sub-centres knowing about it (Table 4.1.5).

Table 4.1. 5 : Knowledge of Vector Control Activities						
	Total facilities Surveyed	Drug sensitivity monitoring time not known	Knowledge of locally prevalent vectors	Procurement of ITNs in past twelve months	Distribute ITNs in past twelve months	Programme for larvivorous fish
		%	%	%	%	%
State/City						
Assam	27	40.7	11.1	25.9	37.0	0.0
Chennai	33	9.1	0.0	3.0	0.0	0.0
Maharashtra	30	40.0	0.0	36.7	36.7	60.0
Orissa	26	11.5	3.8	15.4	19.2	26.9
Rajasthan	28	46.4	3.6	0.0	0.0	39.3
Type of facility						
Govt Hosp with beds	27	48.1	0.0	29.6	25.9	7.4
Malaria Clinic	12	33.3	16.7	33.3	41.7	33.3
PHC	37	35.1	8.1	24.3	32.4	45.9
Sub-centre	25	36.0	0.0	4.0	4.0	44.0
Pvt Hosp with beds	16	12.5	0.0	0.0	0.0	0.0
Pvt Clinic	9	11.1	0.0	11.1	11.1	0.0
Nursing Home	3	0.0	0.0	0.0	0.0	0.0
NGO HF	2	0.0	0.0	0.0	0.0	50.0
Pharmacy/ Medicals	12	0.0	0.0	0.0	0.0	0.0
TOTAL	143	29.2	3.5	16.0	18.1	25.0

4.1.6 IEC and Social Mobilization

Availability of health education material was almost confined to government facilities, being more available at malaria clinics and PHCs (83% and 70%) than at government hospitals with beds or sub-centres (48% each) (Table 4.1.6). The same pattern held true for production of health education materials. Two thirds of the malaria clinics, PHC and sub-centres said that they carried out community mobilization activities.

The local production and evaluation of IEC material were very low (less than 20%) in the private and government health facilities.

Table 4.1.6 : IEC and Social Mobilization					
	Total facilities Surveyed	Availability of any health education materials	Development of any IEC material in past 12 months	Evaluation of health education material	Comm.. mobilization carried out
		%	%	%	%
State/City					
Assam	27	48.1	18.5	22.2	59.3
Chennai	33	27.3	9.1	6.1	12.1
Maharashtra	30	63.3	20.0	16.7	70.0
Orissa	26	46.2	3.8	19.2	46.2
Rajasthan	28	46.4	17.9	35.7	39.3
Type of Facility					
Govt Hosp with beds	27	48.1	7.4	18.5	25.9
Malaria Clinic	12	83.3	25.0	25.0	66.7
PHC	37	70.3	29.7	32.4	75.7
Sub-centre	25	48.0	4.0	20.0	64.0
Pvt Hosp with beds	16	6.3	6.3	6.3	6.3
Pvt Clinic	9	11.1	0.0	11.1	11.1
Nursing Home	3	0.0	0.0	0.0	0.0
NGO HF	2	100.0	100.0	50.0	100.0
Pharmacy/ Medicals	12	0.0	0.0	0.0	0.0
TOTAL	143	45.8	13.9	19.4	44.4

4.1.7 Surveillance and Epidemic Preparedness

There seems to be more collection, analysis and feedback of malaria information in Maharashtra, and to a lesser extent in Assam, and very little in Chennai and Rajasthan (Table 4.1.7). Collection, analysis and feedback of malaria information were confined to the public sector health facilities. PHCs, and to a lesser extent malaria clinics. These facilities seem to be more active than government hospitals with beds or sub-centres, and almost no participation by the private sector.

Table 4.1.7 : Surveillance and Epidemic Preparedness						
	Total facilities Surveyed	Collection of data from HF	Analysis & summary of data	Feedback to higher levels	Feedback to lower levels	Epidemic control committee
		%	%	%	%	%
State/City						
Assam	27	59.3	75.0	48.1	7.4	7.4
Chennai	33	6.1	100.0	6.1	3.0	0.0
Maharashtra	30	73.3	63.6	63.3	43.3	10.0
Orissa	26	26.9	100.0	42.3	7.7	3.8
Rajasthan	28	35.7	100.0	28.6	14.3	7.1
Type of Facility						
Govt Hosp with beds	27	29.6	100.0	37.0	14.8	7.4
Malaria Clinic	12	58.3	100.0	58.3	41.7	25.0
PHC	37	81.1	90.0	70.3	27.0	8.1
Sub-centre	25	40.0	10.0	36.0	12.0	0.0
Pvt Hosp with beds	16	0.0		0.0	0.0	0.0
Pvt Clinic	9	11.1	100.0	0.0	0.0	0.0
Nursing Home	3	0.0		0.0	0.0	0.0
NGO HF	2	50.0	100.0	0.0	0.0	0.0
Pharmacy/Medicals	12	0.0		8.3	0.0	0.0
TOTAL	143	39.6	78.9	36.8	15.3	5.6

4.1.8 Training and Supervision

Staff training was low in all the states, with Assam having the highest number of facilities that had carried out training (37%) in the previous 12 months, and as low as 0% in Chennai (Table 4.1.8a). Availability of training materials was also low. Most of the training occurred at malaria clinics and PHCs (33% and 38%), though it was also low there.

Most training, as expected, was carried out in the government health facilities and at the big hospitals.

Table 4.1.8a : Components of Training and Supervision				
State/City	Total facilities Surveyed	Staff training in last year	Supervisory visits last one month	Training material available on the day of survey
		%	%	%
Assam	27	40.7	29.6	37.0
Chennai	33	0.0	15.2	6.1
Maharashtra	30	13.3	23.3	20.0
Orissa	26	15.4	34.6	19.2
Rajasthan	28	17.9	28.6	7.1
Type of Facility				
Govt Hosp with beds	27	7.4	14.8	11.1
Malaria Clinic	12	33.3	58.3	50.0
PHC	37	37.8	54.1	27.0
Sub-centre	25	8.0	16.0	4.0
Pvt Hosp with beds	16	0.0	6.3	6.3
Pvt Clinic	9	11.1	11.1	0.0
Nursing Home	3	0.0	0.0	33.3
NGO HF	2	50.0	0.0	100.0
Pharmacy/ Medicals	12	0.0	0.0	0.0
TOTAL	143	16.7	25.7	17.4

4.2 Findings of the Household Survey

4.2.1 Sample Size Achieved

Table 4.2.1 : Sample Size Achieved									
State	No. of Households		No. of HH Members	Male	Female	Children < 5		Pregnant Women	
	Expected	Achieved				Expected	Achieved	Expected	Achieved
Maharashtra	1200	1200	5706	2888	2818	360	514	120	160
Orissa	1200	1221	6510	3335	3171	360	512	120	233

Rajasthan	1200	1260	8355	4533	3822	360	1040	120	150
Assam	1200	1314	6382	3281	3101	360	394	120	177
Chennai	1200	1307	6077	3130	2947	360	354	120	110

The minimum sample size for household survey was decided through consensus in the consultation with the statisticians. While the problem of malaria in pregnant women and children under the age of five years may be serious, the survey would not be able to identify adequate number of fever cases in these groups since the sample size required in each domain would become enormous and the survey costs and logistics were going to be prohibitive. In view of the urgency of completing the survey before the Joint Monitoring Mission, it was agreed to fix the final sample size on the basis of a consensus with the experts. The minimum sample size for pregnant women and children under five years age was agreed upon in a consultation with statisticians to assess the proportion sleeping under a treated bed net.

4.2.2 Ownership and Use of Bed nets

Ownership of bed nets is still low in all provinces, with less than one third of households owning a bed net (any type of whether treated or not) (Table 4.2.2a). Ownership of treated bed nets (ITNs) is consequently also low, though the majority of the nets were treated with insecticide in Maharashtra and Orissa. Ownership of bed nets was particularly low in Rajasthan, and none of the nets were treated.

The distribution and promotion of bed nets is not a strategy in Rajasthan. More than three quarters of the nets were in good condition as verified by inspection of the nets during the survey. Because Chennai city does not have a bed net programme it is not included in the comments.

Less than one quarter of people of all age groups had slept under a bed net (treated or not) the night prior to the survey, though this was slightly higher for children under five years age and pregnant women (Table 4.2.2b). Because ownership was very low, usage of bed nets was particularly low in Rajasthan, with less than one percent of people of all age groups having slept under a bed net. Communication for behaviour change needs to be strengthened to fill the gap between the ownership of the bed net and its use. The programme for treating of bed nets needs to be strengthened in order to get an impact on the transmission risk reduction. Alternatively the policy should support long lasting nets.

Table 4.2.2a : Ownership of Bed nets

State	Number of Households Surveyed	Total nets surveyed	Proportion of households with at least one net		Proportion with at least one treated net		Proportion of nets treated less than 6 months ago		Proportion of nets in good condition	
			No.	%	No	%	No	%	No	%
Maharash	1200	1075	378	31.5	23	20.7	223	18.6	1035	96.3

Table 4.2.2a : Ownership of Bed nets										
State	Number of Households Surveyed	Total nets surveyed	Proportion of households with at least one net		Proportion with at least one treated net		Proportion of nets treated less than 6 months ago		Proportion of nets in good condition	
			No.	%	No.	%	No.	%	No.	%
Orissa	1221	1429	358	29.3	321	17.5	251	20.6	1096	76.7
Rajasthan	1260	89	41	3.3	0	0	0	0	68	76.4
Assam	1314	3237	560	42.6	331	0.4	12	0.91	2308	71.3
Chennai	1307	56	30	2.3	1	1.8	1	0.076	54	96.4

Table 4.2.2b : Use of Bed Nets (Any/all type)									
State	Population surveyed			Proportion of population groups which slept under a bed net (any type) the previous night					
	All age groups	children under five	pregnant women	All age groups		Children under 5		Pregnant women	
				No.	%	No.	%	No.	%
Maharashtra	5706	514	160	1093	19.1	129	25.1	24	15
Orissa	6510	512	233	1481	22.7	158	30.8	73	31.3
Rajasthan	8355	1040	150	66	0.78	17	1.6	4	2.7
Assam	6382	394	177	5627	88.2	303	76.9	175	98.9
Chennai	6077	354	110	91	1.5	12	3.4	0	0

The ownership and use of mosquito bed nets was high in Assam (88.2 %) and low in Maharashtra (19.1%) while it was negligible in Rajasthan and Chennai. The use of bed nets during the previous night by children under five years age and by pregnant women was higher than amongst other age groups. The treatment of nets within 6 months of the survey varied between 0.9% and 20.6%. Thus in vast majority of households, the protection by insecticide treatment was not substantial even though some protection may have occurred by the use of nets.

4.2.3: Coverage of Indoor Residual Spraying (IRS)

Nearly half of the houses of the households surveyed had been sprayed once with insecticide at the time of the survey in Maharashtra, Orissa and Rajasthan, with a minority having been sprayed twice and this was done after the malaria season (Table 4.2.3a.). The delay in second spray is not likely to have any impact. A negligible proportion of the houses that had been sprayed with insecticide were sprayed uniformly (i.e. all parts of the wall sprayed) and completely (i.e all rooms in the house sprayed). The uniformity and completeness of the spraying were specifically observed and physically verified by the surveyors.

Table 4.2.3a : Coverage of Indoor Residual Spraying (IRS)						
State	Household Surveyed	HH targeted for Spray	No. Households Sprayed (%)	Number of rounds sprayed		
				Only One round (%)	Two rounds (%)	More than 2 rounds (%)
Maharashtra	1200	600	545 (91)	0 (0)	545 (91)	
Orissa	1221	1136	652 (57.3)	442 (39)	210 (18.4)	
Rajasthan	1260	1047	368 (35)	346 (33)	22 (2)	
Assam	846	846	343 (40.5)	301 (35.5)	36 (4.2)	6 (0.7)

Table 4.2.3b : Coverage of Indoor Residual Spraying (IRS)						
State	Household Surveyed	HH targeted for Spray	Households Sprayed		Quality of Spray	
			No.	%	Households with Uniform and complete spray	%
Maharashtra	1200	600	545	91	22	3.6
Orissa	1221	1136	652	57.3	134	11.7
Rajasthan	1260	1047	368	35	13	1.2
Assam	846	846	343	40.5	144	17

Even though the coverage with IRS was high in Maharashtra (91%) it is likely to be ineffective since the spray was uniform and complete in only 3.6% of the households sprayed.

The number of households mentioned in Assam in **tables 4.2.3a and 4.2.3b** differ from other tables. This is because the data from one PHC of Assam has been ignored. This was done since the information reported by the surveyor was not accurate.

4.2.4 Fever Prevalence in the past two weeks and sources of treatment for fever

Fever prevalence during the past two weeks was higher amongst children under five years age and in most domains amongst pregnant women. This information cannot be extrapolated for the whole year but provides some information on the expected workloads and therefore may help in determining the needs. In Maharashtra, Rajasthan and Assam, the most common source of treatment for those who had a fever in the two weeks prior to the survey was government health facilities (around two thirds of cases) followed closely by private health facilities (one quarter to one third) (Table 4.2.4b). However, in Orissa an equal proportion went to government health facilities as those who went to private facilities/services. It was observed that the majority of the private services were quacks in Orissa. In Chennai more than three quarters went to private facilities/services (Table 4.2.4a), mostly private dispensaries and chemists (Table 4.2.4c).

Use of FTDs and DDCs was quite low in all rural states, ranging from 2.4% in Maharashtra and Orissa to 8% in Rajasthan and 13% in Assam. If the programme wants to persist with the strategy of provision of services through peripheral health care providers in the inaccessible areas, it would be necessary to increase their capacity and to monitor their performance through regular supportive supervision.

State	Population Surveyed			Proportion who had fever					
	All Age groups	Under Five	Pregnant women	All ages		Under Five		Pregnant Women	
				No.	%	No.	%	No.	%
Maharashtra	5706	514	160	83	1.5	16	3.1	3	1.9
Orissa	6510	512	233	247	3.8	28	5.5	9	3.9
Rajasthan	8355	1040	150	134	1.6	19	1.8	0	0.0
Assam	6382	394	177	172	2.7	16	4.1	11	6.2
Chennai	6077	354	110	256	4.2	37	10.5	5	4.5

State	Number with Fever	SOURCES OF TREATMENT											
		Treated same day		Govt. Sector		DDCs, FTDs etc.		Private Sector		Self Treatment/Others		No treatment	
		No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Maharashtra	83	27	32.5	48	57.8	2	2.4	28	33.7	3	3.6	4	4.8
Orissa	247	42	17.0	101	40.9	6	2.4	98	39.7	27	10.9	11	4.5
Rajasthan	134	126	94.0	87	64.9	10	7.5	47	35.1	0	0.0	0	0.0

		SOURCES OF TREATMENT											
State	Number with Fever	Treated same day		Govt. Sector		DDCs, FTDs etc.		Private Sector		Self Treatment/Others		No treatment	
		No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Assam	172	69	40.1	112	65.1	22	12.8	42	24.4	17	9.9	0	0.0
Chennai	256	8	3.1	39	15.2	0	0.0	195	76.2	13	5.1	9	3.5

There was a lot of variation in the seeking of treatment and its provision in the domains investigated. Except in Rajasthan treatment was delayed by more than one day in more than 60% of the febrile cases. This observation emphasizes the need for further strengthening of the delivery of health services.

State	Number with fever	GOVT. SECTOR									
		Govt. Hosp		PHC		Sub-centre		Malaria worker		No Treatment	
		No.	%	No.	%	No.	%	No.	%	No.	%
Maharashtra	83	5	6.0	32	38.6	7	8.4	2	2.4	4	4.8
Orissa	247	44	17.8	37	15.0	1	0.4	9	3.6	11	4.5
Rajasthan	134	18	13.4	33	24.6	25	18.7	1	0.7	0	0
Assam	172	46	26.7	57	33.1	18	10.5	11	6.4	0	0
Chennai	256	23	9.0	13	5.1	1	0.4	2	0.8	9	3.5

State	Number with fever	PRIVATE SECTOR									
		Pvt. Hosp		Pvt. Doctor		Pvt. Dispensary		Chemist		Witchcraft	
		No.	%	No.	%	No.	%	No.	%	No.	%
Maharashtra	83	4	4.8	21	25.3	2	2.4	0	0	0	0
Orissa	247	30	12.1	36	14.6	4	1.6	21	8.5	3	1.2
Rajasthan	134	3	2.2	40	29.9	1	0.7	3	2.2	0	0
Assam	172	2	1.2	10	5.8	4	2.3	26	15.1	0	0
Chennai	256	43	16.8	24	9.4	72	28.1	56	21.9	0	0

*Some percentage of fever cases took treatment from sources which can not be categorized in the above heads.

4.2.5: Blood Examination for Fever Cases

The majority of those with fever had their blood examined for malaria parasites in Maharashtra (61%), Rajasthan (83%) and Assam (61%), though in Orissa it was only 41% (Table 4.2.5a). The low blood examination rate in Chennai could be because the majority of those with fever used private dispensaries and pharmacies for treatment. These facilities did not have arrangements for diagnosis of malaria. While more than half had their blood examined on the same day in Orissa, one quarter were examined after 3 days, more than two thirds had their blood examination after two days in Maharashtra and one third after three days in Chennai (Table 4.2.5a)

Blood examination for fever was done in 27-82.2% cases being lowest in Chennai and highest in Rajasthan. The blood examination was performed within one day of occurrence of fever in 11.8-55.4% cases in the 5 domains. Results of blood test done were available on the same day in 23.5-79.9% cases. No results were yet available in 11.6-45.1% cases.

While almost three quarters of those whose blood was examined got their result the same day in Orissa and Chennai, almost one half in Maharashtra and one third in Assam said they did not get their result (Table 4.2.5b) on the same day.

Table 4.2.5a : Of those who had fever in past two weeks, proportion who had blood examined and time-lapse to get blood examination.

State	Number of Fever Cases	Blood examined (%)		Time Lapse in blood examination							
				1 Day		2 Days		3 or more Days		Others	
				No.	%	No.	%	No.	%	No.	%
Maharashtra	83	51	61.4	6	11.8	36	70.6	9	17.6	0	0
Orissa	247	101	40.9	56	55.4	18	17.8	25	24.8	2	1.98
Rajasthan	134	111	82.8	44	39.6	50	45.0	17	15.3	0	0
Assam	172	104	60.5	18	17.3	39	37.5	51	49	0	0
Chennai	256	69	27.0	28	40.6	18	26.1	21	30.4	2	2.9

Table 4.2.5b : Of those whose blood was examined, the number of days to get results.

State	Blood Examination	Result available in									
		1 Day		2 Day		3 Day		4 Day		No result/ Others	
		No.	%	No.	%	No.	%	No.	%	No.	%
Maharashtra	51	12	23.	11	21.	4	7.84	1	2.0	23	45.1

Table 4.2.5b : Of those whose blood was examined, the number of days to get results.											
State	Blood Examination	Result available in									
		1 Day		2 Day		3 Day		4 Day		No result/ Others	
		No.	%	No.	%	No.	%	No.	%	No.	%
			5		6						
Orissa	101	72	71.3	11	10.9	3	2.97	1	1.0	14	13.9
Rajasthan	111	61	55	20	18.0	13	11.7	1	0.9	16	14.4
Assam	104	37	35.6	30	28.8	14	13.5	0	0.0	29	27.9
Chennai	69	55	79.7	4	5.8	1	1.45	1	1.4	8	11.6

Table 4.2.5c summaries proportion of household members (proportion of children under 5 years separately) who got treatment on same day or within 1 day. While in Rajasthan as many as 94% of fever cases received treatment on same day, in Chennai city only 3% of fever cases received treatment on same day (Table: 4.2.5c).

Table 4.2.5c: Fever cases received treatment on same day/1 day						
State	Nos. of fever cases	Nos. received treatment on same /one day		No. <5yr With fever	No. <5yr received treatment on same /one day	
		No.	%	No.	No.	%
Maharashtra	83	27	32.5	16	4	25
Orissa	247	42	17	28	7	25
Rajasthan	134	126	94	19	18	95
Assam	172	69	40	16	10	62.5
Chennai	256	8	3	37	2	5.4

The treatment for fever was obtained from government or private sector. The range in treatment seeking from the government was 15.2% (Chennai)- 65.1% (Assam). In the private sector the range was 24.4% (Assam)- 76.2% (Chennai).

4.2.6: Fever Prevalence on the day of survey and blood examination.

While undertaking household surveys, household members having fever on the day of survey were investigated for malaria through Rapid Diagnostic Test and blood smear examination. All the *P. falciparum* cases could be identified by using RDTs and were given treatment immediately. Blood smears were examined for the presence of *P. vivax*, also. The presumptive treatment was given and result was communicated within a day.

The fever prevalence varied between 0.5%-2.6%. This could have been higher if the survey was done during the malaria transmission season. The highest prevalence of fever and malaria was in Assam while the lowest prevalence was in Chennai. The malaria was due to *P. falciparum* in 142 out of a total of 157 cases of malaria. In Maharashtra, out of 89 fever cases 37 were positive for malaria and all were detected as *P. falciparum* (SPR & SfR = 41.5%). In Orissa and Assam also the situation was similar with predominant *P. falciparum* infection.

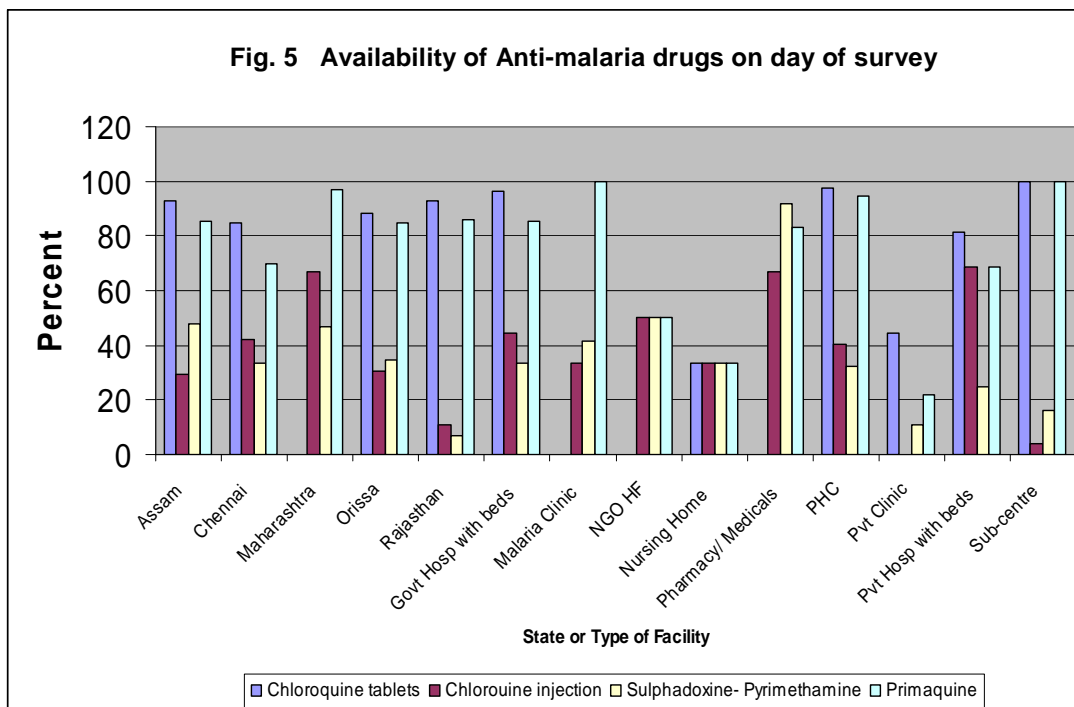
Even though the survey was carried out when it was not the peak transmission season, in the domains studied (except for Chennai) malaria was the cause of fever in more than one third of the fever cases and *P. falciparum* was the predominant parasite (more than 90% of malaria cases). This is related to the selection of the domains that are high risk for *P. falciparum* malaria.

Table 4.2.6a: Fever Prevalence on the day of survey and malaria cases (<i>Pf</i> & <i>Pv</i>)								
	Population Surveyed	Nos. with fever (%) & Examined for MP		No. Positive for malaria	<i>Pf</i>	<i>Pv</i>	SPR (%)	SfR (%)
		Total	Children > 5 yrs					
Maharashtra	5706	89 (1.5%)	9	37	37	0	41.5	41.5
Orissa	6510	109 (2%)	10	38	35	3	35	32
Rajasthan	8355	45 (0.5%)	8	14	13	1	31	29
Assam	6382	170 (2.6%)	16	65	55	10	38	32
Chennai	6077	80 (1.3%)	10	3	2	1	3.7	2.5

5 Discussion

5.1 Resource Availability

Availability of the anti-malarial drugs reflected the current policy on first line and other drugs, being almost exclusively confined to oral chloroquine and primaquine. Of note, is that availability of the first line drugs was good also in the rural areas, even at peripheral facilities such as sub-centres, as illustrated in Figure-5 below. While this may be encouraging in terms of following policy on recommended drugs, it also points to non-availability of choices for resistant cases, though chloroquine resistance monitoring has been done or being done in those areas where *Pf* is a problem. The relative non-availability of quinine and artemisin derivatives points to problem if severe cases are encountered, particularly in Orissa and Assam.



The evidence therefore points towards the effectiveness of the medicines distribution system for first line drugs, so that any change in drug policy could be expected to go relatively smoothly should there be good communication between the policy makers and the implementers.

While availability of microscopes was also good, RDT kits tended to be more available at the same facilities that had microscopes but not at the periphery where they are more needed. This may point to the need for rationalization of which diagnostic method is available at which types of facilities, given the cost and skills implications of either method.

The health facility survey shows that human resources of all types are scarce in the rural areas. Furthermore their capacity to provide prompt and complete treatment is limited. Thus while material resources are available, the human resources to use them seem to be in short supply.

While a focus on policy development based on the findings of studies on drug resistance is important, attention will be needed to simultaneously enhance the capacity of the health system to provide diagnosis and treatment with combination drugs in states where *P. falciparum* malaria is a serious problem.

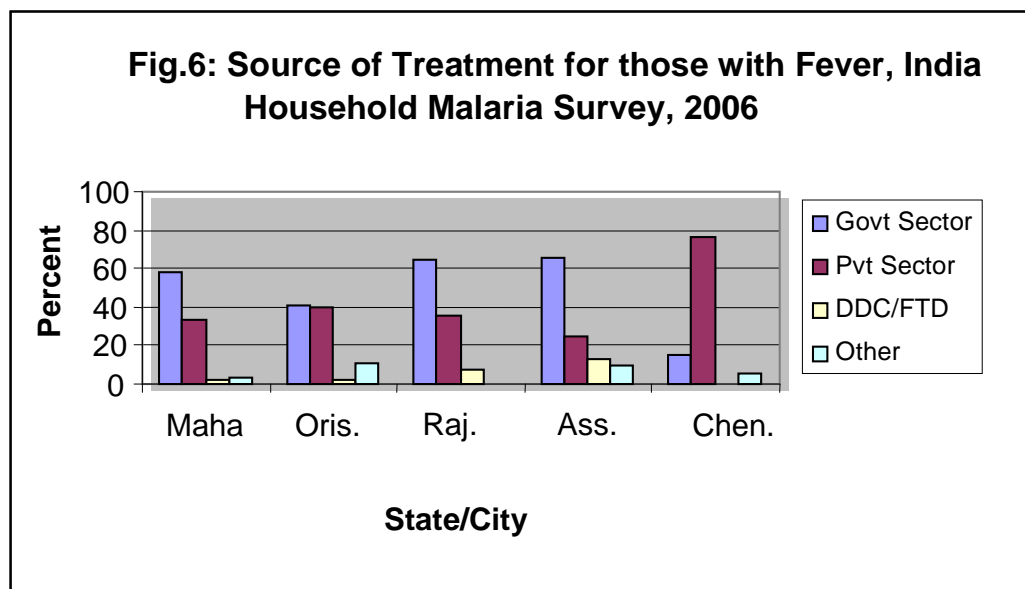
Issues for the JMM

- a) How to ensure good communication between the policy makers and the implementers of the drug distribution system during changeover of the first line drugs

- b) Ensuring quality of diagnosis of malaria by RDKs
- c) Rationalization of the use of microscopes and RDTs
- d) Guidelines for distribution and use of RDKs in inaccessible areas and recommendations on the use of case definition in high burden *P.falciparum* states.
- e) Development of policy on diagnosis and treatment including monitoring of resistance to first line antimalarial drugs

5.2 Case Management

The household survey shows that a significant proportion of the population consults the private sector even in the rural areas as illustrated in Figure-6 below. In Orissa where 40% of those with fever said they had consulted the private health care providers, it was observed that in reality they had consulted quacks, who were not formally recognized and qualified as health workers. This raises issues about the quality of care that these patients receive, and how it can be improved. It also stresses the need for developing partnership with the private sector (both formally and non-formally trained) so that uniform standards of care can be provided.



The household survey also shows that FTD/DDC workers are consulted by a very small proportion of those with fever (fewer than those who consult quacks). What role they should play within the programme may need to be reviewed, to see whether the resources spent are commensurate with the returns realized.

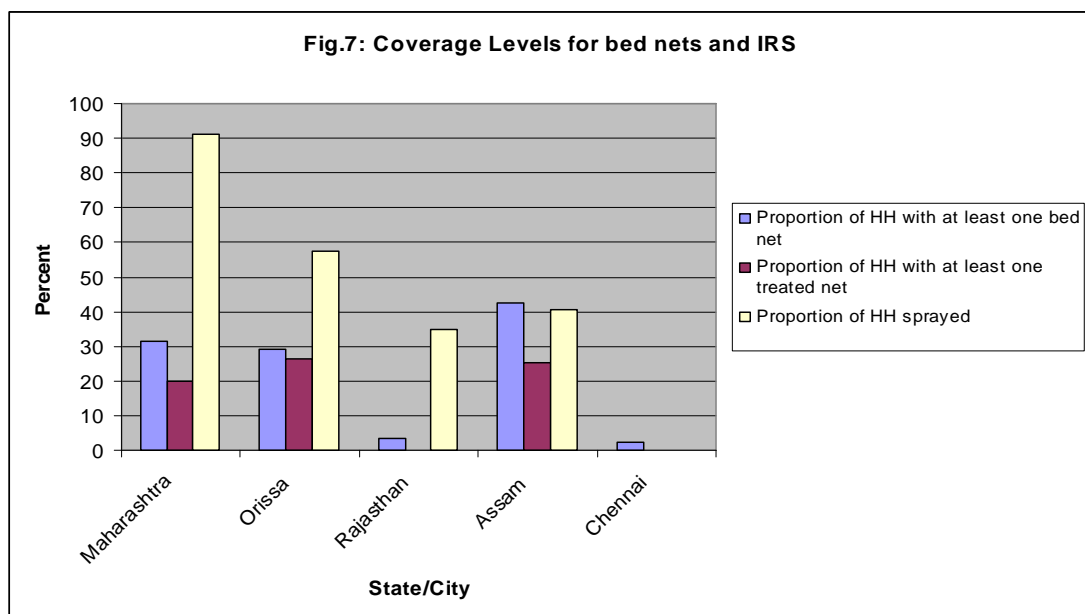
Key issues for JMM

- a) How to more fully involve the private sector and NGOs in the malaria programme.
- b) Defining the role of unrecognized workers in the malaria programme (e.g quacks) and how to involve them in skills development.
- c) Working formal arrangements for partnerships with the private sector and NGOs
- d) How to ensure uniform standards of care (diagnosis and treatment) of malaria in government and private sector
- e) Estimation of supply requirements based on fever prevalence.
- f) Strategies to increase the excess to diagnosis and treatment below the level of PHCs.
- g) Options for active surveillance of malaria

5.3 Vector control

The results of the household survey show that coverage of vector control is still low for all methods (IRS, ITN and larvivorous fish) in all areas surveyed, as shown in Figure-7 below. Studies of the effectiveness of IRS and ITNs have shown that coverage needs to be at least 80%, but preferably 90%, in order to be effective in reducing the vector density and protecting the population. The programme has still some way to reach these levels for either method. Biological control methods, such as use of larvivorous fish, is supposed to be a more friendly and sustainable method but that method is also low in all the areas surveyed. This method perhaps also requires a greater involvement of the community. The health facility survey shows that community mobilization activities were low.

Given that all methods have low coverage, it raises issues about whether all methods should be pursued in all areas or whether different areas should have primary methods which they should concentrate on so that maximum effort can be put into those methods for greater effectiveness.



The household survey also reveals that in addition to low coverage, the quality of the spray programme is low. It was not possible whether the quantity of insecticide was adequate. This raises issues about the supervision and follow up to see whether the work has been carried out according to recommendations of NVBDCP. Vector resistance to DDT has also been raised as an issue. If vector resistance is high, and coverage is low, this raises concern about how much protection the population is getting in areas where DDT is being sprayed.

Key Issues for the JMM

- a) Which method to use for vector control (state or district-wise), and how to improve coverage for the preferred method, in light of current knowledge.
- b) Quality of the IRS programme
- c) Review of available evidence for vector resistance to insecticide, particularly DDT.
- d) How to ensure better communication and involvement in vector control activities by staff working in health facilities, both in the public and private sector.
- e) What role the peripheral level health facilities should play in ITN distribution.
- f) Alternatives to re-treatment of nets e.g. long lasting nets
- g) How can supportive supervision be ensured to get a better quality of IRS
- h) Planning for IRS, based on revised strategy for coverage that ensures uniform and complete IRS**
- i) Planning for increased access to ITNs (LLINs) based on acceptance of the nets by the community.

5.4 IEC, Social Mobilization and Community-oriented activities

Health education and community mobilization activities seemed to be low for most health facilities, being confined to malaria clinics and PHCS, whereas perhaps the greatest opportunity for health education is when patients come to seek treatment. This should be the opportunity to give them information on not only effective early treatment methods, but also preventive methods such as ITNs and cooperation in IRS. Thus, suitable health facilities should be involved in health education.

Issues for the JMM

- a) Need for improvement in IEC and social mobilization.
- b) How to extend the outreach for sharing knowledge through IEC
- c) Involving the health care providers and volunteers below the level of PHCs

5.5 Disease Surveillance and Epidemic Preparedness

With the epidemic nature of malaria in India, disease surveillance should be an integral part of all those involved in malaria control activities, both in the public and private sectors, though this survey suggests that the private sector is either not involved or is minimally involved. Within the public sector, the peripheral level facilities (sub-centres) seems to less involved than the higher level facilities (PHCs). Also the record keeping that has relevance to surveillance in the large public sector hospitals is poor. Sharing of information is also not high, both to higher and lower levels.

Most health facilities reported not having epidemic preparedness plans, most pointing out since there was no epidemic as the main reason for their not having a plan. If

malaria incidence decreases, epidemics will inevitably become more prone, hence the need to be prepared.

Issues for the JMM

- a) Need for greater involvement in disease surveillance by all facilities, with clear roles and responsibilities
- b) Need for more consciousness on epidemic preparedness
- c) The role of epidemic preparedness plan in epidemic control
- d) Coordination with IDSP in improving malaria and VBD surveillance.

5.6 Skills Development and Supervision

Training and updating of skills should be an integral part of any programme, to keep the staff abreast of new development. For example, with changing drug resistance patterns there may be need for staff training on how to be on the lookout for resistant cases or how to treat them. There may also be need for training on vector control methods which even clinical staff can get involved in, such as ITN distribution. The low levels of training was found in most health facilities.

This reality that a not insignificant proportion of the population consults unrecognized health workers such as quacks would need to be taken into account when devising skills development programmes, so that the population gets good care even from these unrecognized workers. The formal private sector would also need to be involved in any skills development programme to keep them abreast of new developments and changes in policy within the national malaria programme, so that all segments of the population are catered for regardless of whom they consult for health care.

Supervision provides an opportunity for staff training, but it was also low.

Key issues for JMM

- a) How to improve skills development
- b) Involvement of the private sector in skills development programmes, including unrecognized workers (quacks), in skills development
- c) Improving supportive supervision
- d) Inclusion of quality in diagnosis, treatment of malaria
- e) Assessing the needs for training and capacity development

5.7 Record Keeping

Record-keeping, or the way of data compilation was a problem at most facilities both public and private. As part of the health facility survey, it had been planned to collect data on cases and deaths due to malaria in the preceding 12 months. However, this data was either unavailable or very difficult to get at most of the facilities.

Key issues for the JMM

- Improving record keeping at health facilities, both public and private and agreeing on how it should be kept.

- Review of records at the district and sub-district levels as a part of supportive supervision
- Sharing of information and its use for planning

6. Recommendations

Conclusions and recommendations to be revised after the review

1. The key issues pointed out in this report will need to be explored further in the JMM to come up with concrete areas of action to resolve and improve them.
2. The findings of the surveys should be used for policy development and programme coordination including public private partnership
3. The findings of health facility survey should be used to strengthen the application of supportive strategies
4. The programme should use the methodology and approach used in periodic surveys as a part of monitoring and evaluation framework for assessing the outputs of the programme
5. The key findings of the health facility and household survey should be used to refine the strategies in the programme
6. In view of the substantial utilization of the private sector the VBDCP should develop sustainable partnerships to ensure application of uniform standards in the prevention and control of malaria
7. The information available from the household and health facility surveys should be used as benchmark to assess the programme performance
8. It is suggested that the National Malaria Programme be updated to include actions to address the key issues pointed out in this report, in particular:
 - i) Actions to improve vector control
 - ii) Improvements in surveillance and epidemic preparedness
 - iii) Community information and mobilization