IN SEARCH OF QUESTIONS…

PROCEEDINGS OF THE MALARIA OPERATIONAL RESEARCH WORKSHOP

KORBA
JANUARY 23RD TO 25TH ,2003

ORGANISED

BY

STATE HEALTH RESOURCE CENTER,

STATE MALARIA CONTROL SOCIETY,

DANIDA SUPPORT UNIT,

CHHATTSIGARH

Hosts : District Administration : Korba

FOREWORD

---In Search Of Questions

“Science is not about answering questions. It is about questioning answers.”

This popular statement describing the scientific approach is particularly applicable to the contemporary scenario in malaria control. The control of malaria, Chhattisgarh’s number one public health problem has been on everyone’s agenda. And just about everyone, has all the answers needed --not only to what needs to be done , but also to why it is not being done. It is only the questions that are lacking.

One can understand such an attitude amongst programme managers. Intensively trained and retrained over the years, one gets conditioned into a mindset where the basic postulates, the technology, the programme design, are all taken as given. But one is surprised that the research institutions too have often exhausted their questions and exist surrounded by a multiplicity of answers. All the technology we need for effective malaria control -we would be told- is all there. It is only the lack of administrative or political will that has failed to keep pace.

Interestingly even in civil society – especially that conscious section concerned about malaria control – the answers are taken for granted and the statement that failure of administrative and political will is the cause , seems to make further investigation and study redundant. Community participation is of course more central to their concerns but its failure too lies in the failure of administrative and political will.

These are not wrong answers. Indeed they are undeniably correct ones. The only problem with these existing answers is that at the cutting edge – programme implementation at the local level -they largely provide explanations – not ways of changing the existing situation. Even of the many existing given answers, which are useful for programme implementation, information on most has just not reached the local level. At this level all that has percolated down is a one point of two point telegraphic message that is essential but hardly

sufficient to overcome the existing bottlenecks. Unlike smallpox eradication that needed a clear focus on only two points – surveillance-containment and immunisation – the control of malaria is much more complex and multi-dimensional. For effective malaria control one needs to know the details of over a dozen different intervention points with more than one technology available for each of these interventions. One also needs to make a critical choice between them and often adapt and innovate them for use at the local level. The “one size fits all” approach hardly suffices and programmes build around pushing down one or two interventions be it spraying or the provisioning of chloroquine hardly suffices.

The urgency to search for fresh perspectives and approaches arises precisely because malaria is not controlled and even where control has occurred- historically, the experience has been that the achievements are poorly sustained. One way forward is to re-examine the issue again in the context of the proposed devolution of planning to districts and the needs of community participation and local planning. More than for any other disease the case for local planning in malaria, a disease known for its local and focal character is unexceptionable. And the basis of good planning especially in malaria control has always been very good locale specific epidemiological and entomological data. This is the sort of data that admittedly no one has yet in the state and the need to make such data readily available- and that too at the district level, becomes the justification for programme managers, research institutions and civil society to come together for building a data base at least on insect and plasmodia sensitivity to chemicals. Locale specific database is also needed to understand vector-breeding habitats so that from a multiplicity of potential breeding sites- local action can be focussed and optimised on the most efficient choices. And a database is also needed on indigenous customs and perceptions of vector control so that technologies and programme designs can be better adapted and shaped.

Local planning does not arise “because one has given up on science/government for solutions and are turning to the people” a way of expressing it where science and people or government and people seem to stand at opposite poles. It is romantic and impractical to expect a community to be able to lift itself up by its bootlaces. Local planning requires a deep understanding of the community and the ability to see the community not as a static homogenous structure but as a dynamic responsive body influenced by structures of power.

Local planning and local action presupposes processes of social negotiation and empowerment before collective action can result – thereby defining a need for externally catalysing the process. But a less recognised and even more important need for external intervention to facilitate local planning is the need to access *the best* available in science and technology. In that sense local planning is far more science intensive- (more science activity per sq km) than centralised planning. And to provide such access to science and technology requires expertise built up in every district of this state – not from training programmes but from actual hands on involvement in the processes of research – data gathering, analysis, the formulation and testing of hypotheses, the ability to question presumptions, the ability to be reflective on ones own opinions. Once such expertise gathers and is applied to the solution of local problems, then one begins to see that many tenets of malaria control, and not only those related to local planning, would need re-examination and modification. That there is such a need for questioning existing answers was time and again evident during the course of the workshop, when many basic postulates had to be critically re-examined.

Research is not a one-time activity carried out a distance, yielding technological packages, that subsequently administrators and managers can buy and apply uniformly -much like an insecticide spray. Research must be inbuilt into every policy and implementation process- forever providing a critical analysis and feedback to constantly improve programmes and build on ones experience. Research must constantly question programme design but technology itself, recognising technology as shaped by social negotiation rather than predetermined by scientific laws. Further research so embedded, (operational research is only one part of it), becomes a process of building up the intellectual capital that is needed for planning not only at local, but at district and state levels too. And it is this intellectual capital, more than self reliance in funds, that could break our dependence for planning on donor agency associated planning processes and the way they centralise and mystify all planning, not to speak of their whims and passing fancies. In that sense building up state level expertise in research and development is all about self-reliance and sovereignty. This was one of the reasons that the State Health Resource Centre was mooted and it would be amongst all its tasks the most challenging.

The three day workshop was stimulating and we were particularly gratified when many malaria control programme managers from the districts told us that it had helped them reflect on their work and given them ideas for action. But what of the answers themselves ? Many of those who attended the workshop would say – “yes there are other ways of looking at it but….” and then quickly reiterate their pet answer!!!”. Well it is a long haul, and we have only made a tentative and insecure start.
The publication of these proceedings we hope makes for another step down this road.

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Dr. Alok Shukla,
Secretary to Government, Department of Health and Family Welfare, Chhattisgarh,

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Ms Ishita Roy, District Collector Korba and her team for their initiative in inviting scientists to study the problem and their support for hosting the workshop at Korba.

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Mr Om Kataria, State Programme Officer and all the district programme officers who organised the logistics and participated actively in the proceedings.
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All the scientists from Vector Control Research Center, Pondicherry, Malaria Research Center, New Delhi and the Regional Medical Research Center at Jabalpur, and the National Institute of Communicable Disease and all other participants who spent three valuable days with us sharing their work and helping us plan ours.

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And all the staff of State Health Resource Center, the members of the State Advisory Committee and the regional development partner ActionAid India for their help in conceptualising the workshop and for their follow up on this agenda long after the workshop was over.

Dr T.Sundararaman.

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KORBA WORKSHOP RECOMMENDATIONS:

The participants in the Korba Operational Research workshop recognise the seriousness of the efforts to contain malaria that the state government is making. To assist and strengthen these efforts the workshop makes the following recommendations:

1. Administrative Reforms in public health sector to ensure an effective public health system is the key for effective implementation of malaria control programmes.

2. Periodic mapping of vector resistance to commonly used insecticides in the programme would facilitate formulation of resistance management strategies.

   Residual spraying on the basis of epidemiological stratification would increase the effectiveness of ongoing spraying programmes.

3. While welcoming the strides made in reaching chloroquine to every hamlet, there is a need to sustain this and strengthen this further by expanding the network of peripheral diagnostic laboratory facilities and creating systems that reduce smear report time to 24 hours.

4. Indigenous techniques (vector control/ prevention of man-vector contact) need to be built on and social marketing of personal protection measures (centred around the ‘haats’ in rural areas) needs to be initiated so as to provide access to low cost protection to the people.

5. Capacity building at all levels needs to be strengthened

6. Effective health education, locally appropriate technological choices made by an informed community and collective peoples action at the local level are three essential elements for sustained malaria control. These three elements are to be integrated into a panchayat level plan as part of the Mitanin programme. This local plan supported by the block health team and integrated with the state's malaria control operations is the core of the approach to malaria control that should be tried out to the widest extent possible.

7. Operational Research feedbacks should be institutionalised to ensure regular review and improvement in programme outcomes.

Note :

The above recommendations are a brief summary .The main content of the recommendations are in the explanatory notes, which are to be read as part of the main text of the Korba Workshop Recommendations. The explanatory notes begin in the subsequent page.

EXPLANATORY NOTES TO RECOMMENDATIONS:

1. **Public Health Sector Strengthening**:

Most of the problems repeatedly emphasised by participants and the lessons from various situation analysis studies presented were related to operational problems. Lack of adequate staff, lack of adequate training, lack of adequate supervision, was the three problems most frequently raised. It was also pointed out that without addressing these core problems responding to reports of deaths and outbreaks merely by disciplinary action was institutionalising underreporting and making disease surveillance and meaningful planning much more difficult. What is needed therefore is a comprehensive workforce management policy and human power development plan that strengthens the public health system as a whole. Financial outlays need to match these requirements. The problems of malaria control cannot be seen in isolation from these considerations.

2. **Spraying**:

Information on vector resistance to commonly used insecticides gathered/generated annually is essential to make rational choices on insecticide use and reduce wastage. Epidemiological stratification of villages based on malaria status and modifying spraying regimes with knowledge of vector bionomics is necessary to optimise insecticide consumption. Currently limited by low availability of entomologists in the state, information on vector resistance is available only from two districts – Durg and Kanker. Utilising technical inputs from both inside the state and from the research institutes the goal must be to draw up a comprehensive map of vector resistance this year and be able to update the map annually with state level human-power, which is developed this year.

3. **EDPT (Early Diagnosis and Prompt Treatment):**

Drug outreach of chloroquine has improved considerably. There are still considerable gaps and serious problems created by the discontinuation of link workers but

hopefully the Mitanin programme should be able to address these gaps. "Presumptive" radical treatment for all cases of fever has been practiced widely in almost all districts as per NAMP norms. There is, however, lack of conviction in following this recommendation even within the public health system. The workshop consensus was that prompt (presumptive radical) treatment, however, should not become a substitute to early detection or be seen to make the blood smear examination (BSE) unnecessary. In the absence of universal access to blood smear examination there would be considerable wastage of scarce resources; increased risks to fever cases and increased problems of patient compliance. Also long term goals dictate that presumptive treatment be seen as an immediate measure to be kept to the minimum levels needed for intensive transmission control. The department's current efforts at increasing access to BSE by increasing peripheral diagnostic facilities need to be expanded even further and local systems of smear taking , transport of slides, prompt examination of slides and most important transmission of reports back to health workers and patients needs to be strengthened. With properly organised community support synergised to department efforts -reaching a "taking –smear-to report-reaching-patient" time of 24-48 hours should become possible for most villages. The workshop also noted that distribution of chloroquine to fever cases as the single major measure may reduce morbidity and mortality but to sustain disease control, area specific vector control or preventive measures need to be devised and implemented through the community

4. **Personal Protection Measures**:

A number of traditional measures are in use. We need to encourage such measures while in parallel evaluating them for efficacy and then disseminating this knowledge widely. Other personal protection measures such as oils, creams, smoke repellents, mosquito nets and insecticide impregnated mosquito nets need to be promoted and made accessible to villagers.. Ideally they should be indigenously manufactured and made available at low cost through sales outlets located in the haats-the state only playing a catalyst and supportive role by providing stocks and working capital and perhaps sales commission costs so that they can be sold at costs.

Biological control: In the use of fishes for larval control also the approach should be to optimise and strengthen indigenous options while simultaneously making Gambusia available to the community from well stocked block level hatcheries –at no cost or at low rates.

5. **Capability Building**:

Training needs for private practitioners in rational therapy was one major concern. Training needs for laboratory technicians was another major concern. Training needs for spraying operations was a third major concern. Other than these major needs there were still training needs for every category from depot holders and Mitanin's at one end to district malaria officers at the other.

6. Panchayat level Planning:

Building a gram panchayat level plan for malaria control is seen by the workshop as one of its most important outcomes. This local planning process would be the major form of educating the community about malaria, about how it is transmitted, about the public services available for its control and their need to facilitate and use these services, about technology options for vector control and about what they can individually and collectively do towards vector control. Elected Panchayats would play a leadership role and can be provided with some funds towards implementing such plans. The planning process needs to be facilitated and synergised with the health department's efforts ensuring that by doing so that the local plan supplements but does not substitute for the state malaria control operations. The block level plan should represent the integration of these two elements. At the gram panchayat level the local mitanins acting together with leadership from their facilitators and trainers would provide the node around which collective action in planning and plan implementation would be organised.

8. **Operational Research Inputs**:
Malaria control programmes, existing and new ones need to be systematically documented, studied and used as feed back to improve on outcomes. Currently success and failure is seen as dichotomous and its causes are reported as impressions and as anecdotes. Whatever data is generated is from within the public sector and this (as we have noted above) has its own limitations . Such data also excludes the information potentially available in the much larger private sector. Operational research needs to be institutionalised within the state if state health planning has to be scientific. Such operational research will also optimise use of resources. Operational research will also have to build in an independent database on key figures to use as baseline for programme intervention studies so that outcomes can be assessed. A system of disease surveillance and other linkages that utilises inputs from the private sector for health planning must also be evolved. Operational research would provide the feedbacks needed for constant programme improvement and when capabilities are built up would become the basis of state level health planning.

Research Input Needs identified by the Workshop:

Other than recommendations for current programme implementation, the workshop had also to identify key research questions, which related to operational aspects of malaria control. In this area the workshop recommended the following questions for prioritisation in research.

- Determining susceptibility status of vectors to commonly used insecticides
- Determining drug sensitivity status of malaria parasites in areas reporting treatment failures.
- Inter-specific association of Gambusia fish with local breeds
- Assessment of KAP of the local community towards malaria and malaria control.
- Evolving suitable mechanisms to assess the impact of IEC/advocacy in behavioural changes in the community.
- What is the exact/ actual burden of malaria incidence- especially in view of many cases going to private sector? How many cases per sub-center- area go to a private sources only/also?
- What is the cost effectiveness of FRT (radical treatment of malaria in all fevers) as compared to Radical treatment to only microscopically proved positives?
- What is the efficacy of various indigenous mosquito repellent options?
- What is the relative efficacy of different strategies to promote the use of personal protection measures? – both as regards distribution/marketing and as regards behavioural change?

- What are the barriers to the use of nets? What is the comparative effectiveness of different approaches to behavioural change?

- What selection criteria or distribution mechanisms maximise utilisation of bed-nets? Especially, if they are to be supplied free!

- What is the best way to get regular data inputs from the private sector? How viable is a NATHI type model for getting information.

- Why does malaria peak in winter? What is the transmission dynamics of malaria in different eco- types i.e. hilly, forested and plains?

- What are the transmission risk factors and in a combined control approach what is the relative contribution of each element alone and together in transmission reduction.

- To what level is community based local planning for malaria control effective as health education and in vector control and in reducing malaria indices. What are the ways to optimise community based interventions and to what extent are various forms of bioenvironmental control effective?

Research Projects Shortlisted for immediate implementation.

1. Study using common protocol to map vector resistance patterns. -MRC to draw up action plan and organise technical inputs.

2. Study using common protocol to study drug resistance pattern in all districts.

3. Study on larvivorous efficacy of indigenous fishes and their inter-specific association with Gambusia fish.

4. Concurrent process documentation of the introduction of impregnated bed nets in a community.

5. Evolving an IEC strategy to go along with impregnated bed net introduction.

6. Documentation of and evaluation for effectiveness of various indigenous personal protection measures.

7. Study on vector bionomics in relation to transmission dynamics of malaria(One specific question that has a focus within this area is the winter peak of Malaria in Chhattisgarh, its determinants and their control implications).

8. Multi - centric hospital based case-control epidemiology with reference to associations of severe forms of malaria and mortality in malaria.

9. Operational Research to document processes and relate them to outcomes for a Block level malaria control plan based on local planning and community participation- as suggested in the recommendations.

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PROCEEDINGS OF THE KORBA MALARIA OPERATIONS RESEARCH WORKSHOP – A SUMMARY:

January 23rd to 25th

INAUGURAL SESSION :

The Chhattisgarh Malaria operational research was held in The NTPC training center in Korba from January 23rd to 25th. The workshop was organised jointly by the State Malaria Society, the State Health Resource Center and the Danida support unit and funded from the project Chattisgarh Basic Health Services Unit of Danida.

Welcoming the delegates Ishita Roy, Collector, Korba thanked the scientists from the four leading malaria research institutions – the Vector Control Research Center, the Malaria Research Center, Pondicherry and the ICMR research institute at Jabalpur and the National Institute of Communicable Disease (field station at Bastar)for having agreed to participate in the workshop.

Introducing the workshop objectives Dr Sundararaman stated that was malaria was an old enemy against which many battles had been fought. Initially we had done well and malaria cases dropped from over 70 million cases out of 400 million population at the time of independence to less than a lakh by the early sixties leading us to talk of eradication of the disease. Unfortunately these gains could not be consolidated and malaria bounced back to over 9 million cases and was with strenuous efforts under the subsequent programmes brought down to about 2 to 3 million, at which level,despite repeated adoptions of newer policies and schemes –it has largely remained static. This setback was attributed to restricted financial outlays, administrative inefficiencies and insecticide resistance.

However another parallel discourse attributed the setbacks to the overall programme design – where one or two technological solutions were widely applied with inadequate efforts at community basing it or of using locally appropriate bio-environmental control.

Over years of efforts, programme officers in Chhattisgarh had their own ideas of how to go about malaria control but there was not enough programmatic flexibility to incorporate local insights and specificities. It was primarily to facilitate the state malaria programme and its officers that this workshop is being organised. Scientists had been invited who had worked in this area for decades and had much to suggest. Also in the context of the ongoing Mitanin programme there was openness to new ideas and an opportunity for community centring the programme.

The expected outcomes of this workshop was not a state level malaria plan but an approach to building up the data base required for state level planning and for attempting replicable and scalable models of malaria control which lead to sustained reductions of malaria morbidity in the state. Also to identify research questions which address unsolved social, operational and technical issues and which help the state gain more insights from well-planned research studies. The objective therefore it is to build a clear roadmap on where we want to go from here. However given the urgency of malaria control there would be a set of recommendations to address immediate concerns as well.

Dr Madanagopal, Adviser, Danida Support Unit described the ongoing Basic Health Services bilateral programme and the efforts being made to synergise the efforts of SHRC, DSU and the directorate. This workshop was a further example of this coordination.

Dr.Rajmani, Director Health Services stated that malaria remained the single largest health problem of Chhattisgarh and expressed his hope that the scientists from various premier research institutions of India who had come for the workshop would be able to assist the health department in finding a solution to this problem. It was difficult to understand why this problem has persisted but hopefully we would be able to take this initiative forward so that we are able to tackle this problem adequately.

Dr.Alok Shukla, Secretary Health – expressed satisfaction about the arrangements. Recalling the history of malaria control he submitted that the problem of malaria control was not one that scientists by themselves would solve , though every such problem did indeed have a techno-managerial dimension. There is a human and community solution. We have to

recognize that this is true not just for malaria but for all other development issues as well. This workshop was being held at NTPC which is a techno-managerial organisation with a techno-engineering outlook, but increasingly such organisations have learnt to stress the behaviour management aspect for its senior managers. There is also the example from the Indian Railways where rails were rejected by the railways because of the poor quality. Analysis by the top management showed that it was the lowering of the employee morale, which resulted in the quality slipping.

Raising the question as to why eradication of small pox had been possible and why the anti polio campaign had been largely successful in contrast to the limited gains against malaria, Dr Shukla advanced the hypothesis that it related to the simplicity of the technical intervention needed. If the technical solutions are easy, social interface is easier. Small pox had a simple one point technical solution - getting everybody vaccinated. Social interacion was limited. Polio control in contrast was more difficult because you have to get a number of doses administered. Therefore where community basing existed in a viable form, we have been able to administer the vaccine. But in states like UP an Bihar we have not been as successful. Now take malaria – there is no vaccine, - no single solution and there many variables like differences in insecticide and parasite resistance + and vector species. The solutions become multiple - kill the larvae, kill the mosquito, protect oneself from bites, taking presumptive treatment etc. Programme managers cannot as easily drive this down- not because of technical limitations but because of human ones. Here it becomes much more important for the village to be fully involved to decide on the appropriate strategy and ensure its implementation. Till they are involved completely in this programme we cannot offer a solution.

The focus therefore should not be on a state plan but on a community plan and it has to happen today, not tomorrow nor after a year. I am not suggesting that we start everywhere today. But we should start where communities are ready, across the state. Our state plan simply is that we must take the message to all our mitanins and panchayats to make with what we think are the technological solutions. We have to give them an assurance that everything they need for this plan will be provided for by the state. That is all what a state plan is all about. We provide the training and people make the village level plans. Even if all the 742 villages are not able to make this plan in korba, let 50 villages make this plan. Only then

will our efforts be successful. Our state plan is therefore not about the quantity of DDT. What we can guarantee is that there will not be a dearth of resources for the health needs of people in the state. And any village which makes this plan will have the resources.

The workshop objectives needs to reflect this -. one of the outcomes of this workshop should be to lead to a malaria manual which will help people eradicate the problem in their own village/ hamlet. Secondly if the village makes an action plan how will this be sanctioned and the resources provided to them. My suggestion is that panchayati raj institutions should be involved and it is for us to make a resource transfer plan. Let every mitanin share her plan with the gram panchayat and then get the approval. This could then be approved at the block and district level. The state level committee could then approve this plan at the state plan. This funding mechanism should be clearly outlined as well.The next level is the accountability mechanism that is built into the plan. Unless we add these social aspects our recommendations will only be on paper.

Dr Mehta, Chief Medical Officer, Korba then proposed the vote of thanks.

WORKSHOP OBJECTIVES :

1. To understand the situation in malaria and the ongoing malaria control programme in the state of Chhattisgarh.

2. To identify key areas where there are problems and bottle necks in programme implementation.

3. To identify key epidemiological and entomological questions that need to be studied further.

4. To identify the database requirements and surveillance mechanisms for adequate district level planning and state level planning on malaria control.

5. To plan for studying the social –biological interface of disease and disease control in the context of different cultural and ethnic groups and geographic areas.

6. To understand the possible contributions that community participation and local planning can make in the area of malaria control.

7. To build operational research models to validate different programme approaches.

8. To build collaboration between vector control and malaria control institutes and the state health department of Chhattisgarh for planning and implementing further studies.

The workshop was to generate three types of outcomes:

1. Block/or sector level operational research models along with research collaborators.

2. Research programmes addressing key questions in social, clinical epidemiological or entomological areas where definitive answers are needed for future planning.

3. Recommendations to current programme where appropriate and considered feasible within programme constraints.

SCIENTIFIC SESSION –1:

MALARIA SITUATION AND MALARIA CONTROL IN CHHATTISGARH: PROGRAMME OFFICERS PERSPECTIVES:

1 : Overview:

Mr.Om Kataria, State Malaria Officer –

Mr Kataria began his presentation with a background about the state of Chhattisgarh. The state has 16 districts, with a population of 2.25 crores of which over a third are of indigenous peoples. Forests cover 40.06% of its area. 82% of the population is involved in agriculture. Of the total irrigated area over 80.76% of irrigation is by canals. Its annual rainfall is 1500mm.

Of the 16 districts, the Enhanced Malaria Control Programme covers 13 districts. Only three districts -Janjgir, Kawardha and Mahasamund- are excluded. The districts identified as high risk include Sarguja, Korea, Jashpur, Korba, Raigarh, Dantewada, Kanker, Bastar, and parts of Durg and Raipur.

The Annual parasite Index (API) of the state rose from 10.84 in 1997 to 19.88 in the year 2000 and since then has declined to 12.89 in 2001 and 10.21 in 2002.Deaths reported in the corresponding years were 50, 63 and 32 and 3 respectively. The Pf rate is 69.35%. In EMCP areas the API fell from its peak of 15.39 in the year 2000 to 10.21 in the year 2002 and deaths from 63 to 3.

The API has fluctuated being 13.89 in 97 and 12.8 in 99, then rising to 27 in 1999 and then declining over the next three years. (2000- 18.97, 2001 – 17, 2002,15.7).

SPR (slide positivity rate) and SFR(slide falciparum rate) comparison during the epidemic of 1999 shows that the SFR has been steady. But deaths had increased to 63 deaths (confirmed by the State Malaria Office) in 2000.
In terms of contribution of malaria cases the highest is from Bastar (16%),Jashpur (16%)Dantewada (14%), followed by Ambikapur (12%) and Kanker (11%).

Under the states malaria control plans the thrust has been on early diagnosis and prompt treatment. A major effort has gone

into ensuring access to chloroquine tablets in every hamlet through depot holders, community health workers and Mitanins. Another aspect is expanding diagnostic services by training more personnel with laboratory skills and trying to establish a diagnostic facility in every sector. The aim is to reduce BSE(blood smear examination)reporting time to less than 7 days and reach an ABER(annual blood examination rate) of 12.5%- of which 60% would be under active and 40% under passive surveillance. Active surveillance would be through the 5625 sanctioned MPWs and passive surveillance through the medical and health institutions including the depot holders and Jan Swathya Rakshaks at the village level.

There is also a major thrust in Gambusia introduction. At Raipur in the fish research and training center and at Bilaspur at the Fish research center, Gambusia are being bred and this is transported to district level and block level hatcheries from which it would move to village level hatcheries.

An IEC campaign with focus on malaria in the month of June was also a major feature of the state malaria control operations. Among the major constraints was the lack of adequate entomologists in the state – therefore only focal studies have been carried out on insecticide resistance. The susceptibility status to DDT of the main vector species is known in a few areas. In almost all areas An. Culicifacies is resistant to DDT but sensitive to pyretheoids. Data for 2002 is available from 4 districts. Earlier to this is a 1997 data from another four districts. Still DDT is the mainly used insecticide and it may be useful against An. fluviatilis. In Dantewada, Bastar and Kanker synthetic pyrethrides are the mainstay of spraying. Though in many areas mosquitoes are susceptible to malathion the acceptability of this is less.

Clarifications and Comments emerging during discussion :

- The potential area for spraying – all areas more than 2 API- covers over 90% of the state. Last year however spraying was restricted to only those areas with more than 5 API. as only 500 MT provided against a demand of 1200 MT. Only 50% of the target area therefore could be covered.
- No urban area was sprayed. There is no major urban malaria. In Raipur Medical college OPD in 2002, 9000 blood smears were examined on which only 178 were positive and of these 114 were Pf. Active surveillance

in about 2,00,000 population showed 278 positive cases almost all Pf.

- FRT (Fever Radical Treatment) is given to all fever cases. This is given on first day of fever along with chloroquine – 45 milligram of primaquine – presuming all cases of fever to be Falciparum malaria.
- Currently there is a delay of 15 days to even one month or so in testing because microscopic facility is available only at the block level. Now these facilities are being put up in sector level as well.
- Since there are many areas which were left out of spraying it is possible and desirable to do a study on the impact of spraying
- Web based monitoring system is in place. But as of now only 5-6 districts are regularly updating it. Reports are sought on every day when there is an epidemic.
- Insecticide treated bed nets are being introduced on a pilot basis.

2. Kanker- Case Study Of Successful Reduction:

Dr SK Singh, District Malaria Officer, Kanker.

- Kanker is in southern Chhattisgarh – the northern part of erstwhile Bastar district. It has 7 blocks of about 7.0 lakhs population and has an almost 100% tribal population. Total number of villages is 1065 with 10 PHCs.
- Spraying was stopped from 1996-99. The total number of cases in 1999 was 68,000 cases and the reported API was 101 for the entire district. In 2000, 20% of the population was covered. This rose to 30% in 2001 and 50 % in 2002. In 2000 and 2001 there was one round spraying and in 2002 there were 2 rounds. In 2000 there was 70,000 cases, which fell to 37,000 in 2001 and further to 27,000 positive cases in 2002 with an API of 37.39%. Deaths reported are now nil against 15 deaths reported in 1997. Pf rate in 2002 was 89.14%.
- There has been a sustained increase in malaria control activites. Drug depot holders were established this year across the district. Where there were only 10 BSE laboratories earlier now there are 34 laboratories in place. Slide collection and examination report reaching back time reduced upto 7 days. We have introduced chloroquine and primaquine in FRT programmes. Public participation had increased by involving panchayati raj

institutions as also involving baiga and other local healers (gunia). In 1999, 5-10% of the baigas had become the depot holders and the rest have been advised to send all fever patients to the doctor. In year 2000 a workshop was held at the sector level for all baigas and gunias. As a result of all these measures positive cases continue to decline.

Clarifications and Comments emerging during discussion :

- When depot holders get a fever case they take a blood smear slide and give chloroquine.
- How is the slide sent to the sector level? . Malaria Link Workers collects slides from depot holders and Mitanin. Every alternate day the slide is sent to the sector laboratory.
- Sub-centres have been stratified on the basis of API and spraying was focussed on higher risk areas.
- In Charama block in 2002 only 20% area was sprayed but there was a 67% reduction (in 5 out of 28 sections).
- Research team from Nainital (MRC) showed resistance to pyrithrides. The study however was not complete.
- In some PHCs access is very difficult especially after rains. So anti malaria operations cannot be carried out.
- Main problem according to the presenter is the lack of human-power.
- No cross-checking is done of slide reporting. The central laboratory in the state – used to do cross-checking it has been closed for some months now.

3.The Durg Experience.

SK Mandal ,District Malaria Officer, Durg.

Durg district has been able to control malaria by a number of strategies.

From 1997 voluntary malaria workers were appointed in 1800 villages and malaria link volunteers have been appointed in all the villages with the help of the panchayats. The key strategy of malaria control used was early diagnosis and prompt treatment. This was based on universal availability of chloroquine tablets. A malaria voluntary worker was designated for every village. Even

police stations were given tablets of chloroquine and given the tasks of slide collection. In 7 sectors in high-risk block, sector supervisors and MPWs were trained and microscopic facilities established. Radical treatment is supposed to be given by health supervisors. But in reality this is not happening. On verification only 50% patients were taking medicines as per norms. The population still in high-risk areas was 5-6 lakhs. In high-risk areas DDT spraying coverage was 76%. Biological control – From 1997 onwards 1,00,000 gambusia fishes were released every year. The breeding places were identified by the panchayats.

Another major dimension was training programmes. There were training programmes organised for MPWs and MLWs (malaria link workers). Many medical officers working in remote areas have also been trained. We also had training programmes of quacks and traditional healers as well as for private practitioners so that malaria cases are treated adequately.

For awareness building and IEC activity the panchayats were involved. The core of the IEC programme was the Panch Prayas chart. The five messages were a)any fever could be malaria b) prompt treatment of all fevers with chloroquine c)full course of treatment d)using waste engine oil for pouring on water bodies as a larvicidal and e) slides to be taken for all the migrant and migrating workers.

As a result of these measures malaria came down from 18,858 in 1998 cases to 3343 cases in 2002 - with no deaths.

4. The Bilaspur Experience :

Dr.SK Lal District Malaria Officer, Bilaspur.

There has been an attempt to do a longitudinal study of vector bionomics and relate it to climatic conditions.
The summer temperatures start rising in mid march and peak in May- early June. It starts declining in the second week and the monsoons break in the third week of June. Rains are heaviest in July, August and persist into September. Rainfall is usually in 1400 to 1600 mm. range.

Summer temperatures go up to 47 degrees and it can drop in winter to even 4 degrees C. The terrain is largely either forests or paddy fields.

Though precise documentation is not available the trend is that for An. culicifacies the human biting density starts rising from July and peaks in September and then declines to its trough in January. An. culicifacies is as expected recorded higher in cattle sheds.

An. fluviatilis is seen in hilly areas. Its density is low till September when it starts rising and it peaks in November, December. However sporozoites have not been seen in dissection in our study. Sensitivity to DDT was intermediate in one(76.47% mortality) and low in two of the three PHC areas where it was looked for.

5. Clinical Experience from a public sector company hospital:

Chief Medical Officer: Balco hospital,Korba District :

The clinical challenge of malaria management was highlighted. There are resistant cases coming in with recurrences over 20-30 times. Interaction with NMEP cell in Delhi 3-4 years back but there were no responses. Should we treat these cases as re-infections or is it resistant malaria?

There are no typical cases of malaria. In recent times, since about 1997, atypical presentations and symptoms of malaria are increasingly seen. One case went to ENT surgeon and needed X-rays of cervical areas for glandular enlargement and many other tests. The patient died after two days –It turned out to be malaria. How could malaria manifest itself in such a manner? The treating physician is deceived. It is difficult to convince the relatives and unions how the patient has died. Even cases of acute abdominal distress are being sent for a blood smear.

The presenter’s experience was that when he was in Hindustan Copper, Rajasthan, in the 1980’s there was a total reversal in vivax and falciparium malaria. What was a 98% vivax has become 90% plus falciparum. This same pattern is seen here too.

What is the immunological status in malaria and is it being compromised? What is the role of the kind of expensive tests that we have to do in the context of community medicine. What about the cost factors?

Plenary Discussion: What are the problems that the malaria control programme is facing in Chhattisgarh?

1. Training needs are there for so many categories of persons. Training of private practitioners and quacks, who see the bulk of fever cases, is essential. So is training of government staff from village health guide to medical officers.

2 There is a shifting pattern of malaria - rural to urban.A shifting population has ensured a shift of malaria from the rural to urban areas. Development of urban slums has contributed. Legislation is needed to ensure that mosquito breeding sites do not multiply.

3. Is Pl. falciparum resistant to drugs? Do we have enough information on this? Though there are plans of generating this information from 4 teams in the state, this is not functional yet. The 4 teams trained in Hyderabad have since trained all key block level staff. There is some data from Kanker district. A plasmodium sensitivity map is certainly overdue.

4.Vacancies not filled in the malaria department is one of the administrative issues – one of the constraints.

5. Death due to malaria seems to be negligible despite tens of thousands of falciparum cases. How is this possible? Differing viewpoints emerged:

a. Because of the pressure of the punitive action, deaths are not reported. Many deaths occur in all tertiary care centers, even in the Korba hospital but it cannot be reported because of the pressures not to report.
b. In every village visited by some observers there are deaths over the last six months – conscious and unconscious under-reporting is happening. Under reporting threatens the entire surveillance system. Malaria is known to have a case fatality ratio of 2 to 5%- even with optimal care. This is more so where severe forms of cerebral malaria are seen. Reduction in deaths without corresponding reduction in malaria incidence should be viewed with caution.
c. In highly endemic areas because of higher immunological resistance there is less severity of affection and therefore less deaths than are expected.
d. Availability of chloroquine in depots lowers mortality without necessarily lowering transmission. Hence high

malaria incidence is high but disproportionately lower mortality.

6. We need to have a regularly updated map of insecticide resistance patterns for the state. The study should be done annually before and after spraying operations, which are usually done in rainy seasons and after.

7. Much of the control is really dependent on Early diagnosis and prompt treatment(EDPT). But the evidence is that though EDPT is useful and essential for the reduction of morbidity and mortality its impact on malaria transmission is marginal – more so- in high malaria endemecities. Only below a certain API level – about 2 – can EDPT make a significant contribution to malaria control.(comment from Dr Jambulingam, VCRC).

SCIENTIFIC SESSION 2:

STUDIES ON MALARIA IN CHHATTISGARH AND SIMILAR TERRAIN:

1. Situational Analysis – the Malaria Research Center role and preliminary report from Chhattisgarh area.

Dr.Adak, Dy Director,MRC New Delhi:

The work of MRC and it's field stations was outlined. Situation analysis concept came only in 1999 under the rollback malaria programme –and in 5 districts- Rajasthan, Mizoram, Karnataka, Chhattisgarh this was taken up. The – NAMP assigned MRC for an analysis on Raigarh, Mahasamund, Kanker and Bastar.
Chhattisgarh study was limited by its sole reliance on state programme data. As 2001 data was provisional year 2000 data was used. Reading of this data shows Kanker, Jashpur, Ambikapur and Bastar to be the most problematic areas in terms of SPR. In terms of API, Kanker, Bastar and Mahasamund have the highest rates and if we can control it in these districts – we can reduce the burden of malaria substantially in the entire state. (note: the picture changes if we correct for district population).

Incidence wise Pf overwhelms the PV cases in the state. 69%of all cases is of Pf. Pf is much easier if it is responding to the drug rather than the control of vivax. In some districts –Durg, Rajnandgaon, dhamtari etc. vivix s a major problem though malaria incidence is a s such low there.

The Ahmedabad urban town study showed that the actual incidence is more than 18 times the currently established disease burden. There is reason to believe that this extent of underreporting is widespread and one would have to examine the data from this state also in this light.

The Roll Back malaria (RBM)programme envisages multiple prevention interventions with selective and integrated vector control, insecticide treated bed nets(ITMN), bioenvironmental measures and a personal protection

measures focus. Further RBM requires evidence-based decisions – evidence on local transmission dynamics, vector biology and ecology, best practices – mapping and GIS and an earl warning system. There is a package of technical support needed for effective malaria control. These include situational analysis, drug resistance and its management policy, surveillance, information and management systems and epidemic response systems and transmission risk reduction strategies. Vector incrimination data is not available anywhere in the country except where VCRC and MRC have field centres. Vector biology and vector ecology are two critical inputs for programme planning. Often we are introducing the bed nets without knowing these two critical indicators. Chhattisgarh has two vectors. One of which is An. culicifacies, which itself has five subtypes or sibling species with five different biting rhythms and bionomics. Species C& D for example are early night biters where bed nets have a limited role whereas species A and E are all night vectors with high sporozoite rates. Sp B is a non- vector. it is very important to know this detail.

Vivax relapse rates in many studies (longitudinal) vary across the country from (28.3% in Kheda district) to 8.6 % in Sundergarh (Orissa) and 8.9% in Mandla (MP). Some studies show that there is no difference between 3 days and 5 days radical treatment. In areas where we are giving FRT we need to study the relapse rate.

A situational analysis of Tumkur district was presented showing strengths and weaknesses. The key issues in implementing the RBM initiative were evolving evidence-based programmes, strengthening district health system, promoting community partnership, strengthening partnership with other sectors and development agencies and evolving social movements to tackle malaria.

Clarifications and Comments emerging during discussion :

- What is the true burden of malaria in this state or anywhere? The need to have estimates of this other than from department reporting was reiterated.
- There is still a need for a god situational analysis study in Chhattisgarh. Also to chart out insecticide sensitivity. An. culicifacies subtypes have been inadequately studied.

2. Study Of Vector Behaviour In Lailunga Block Of Raigarh District.

Dr.AK Mishra ,Senior Research Officer, MRC-field station, ,RMRC building,Jabalpur.

Entomological and epidemiological surveys were carried out in 20 villages of Lailunga PHC area in Chhattisgarh state during the months of April, June, September in the year 2002. The man- hour density of the indoor resting anophelines observed was 42.8.In light trap collections the per trap per night density of anophelines was 11.6 indoors and 83.7 in the outdoors. The anopheline fauna of the area consisted of 10 anopheline species including two main malaria vector –Anopheles culicifacies and Anopheles fluviatilis and one suspected secondary vector viz Anopheles annularis. Susceptibility status revealed An. culicifacies 90% resistant to DDT. The corrected percent mortality was 10.8 and 89.7 against DDT 4% and malathion 5% respectively. Point prevalence study to assess malaria incidence in some villages revealed the Plasmodium falciparum incidence to be 62.8%.

3.The Study of Malaria and Malaria Control of Koraput District :

Dr. Jambulingam, Dy. Director, Vector Control Research Center, Pondicherry :

Koraput is one of the southern districts of Orissa of about 27,000 sq. km area and a terrain similar to southern Chhattisgarh which it borders. It has a 3 million population dispersed in over 10000 hamlets and is made of over 56 tribes. Even prior to independence this was known to be a high transmission area for malaria. This was one of the areas where the first DDT trials were carried out. Despite early reductions this was one of the identified high malaria areas in the 80’s when the VCRC work in this area started.. The study aimed to understand reasons for persistent high transmission and look for evolving operational guidelines for its control.

The base line study showed an API in the 275-500 range with a species distribution of P. falciparum : 60-90%,

P.vivax : 8-30%, and P.malariae : 1-4% Mixed : 2-20%. The incidence level varied with the ecotype.
26 anopheline species were recorded which included 9 recognised vector species. An. fluviatilis was incriminated as the major malaria vector (Sporozoite rate: 0.28 – 5.1%) and An. culicifacies as the secondary vector (0 – 0.1%). An. minimus was found to have disappeared (the major vector earlier).

An. fluviatilis was abundant during rainy months (Jul-Sept) and peaks in cold months (Oct- Dec). In contrast An. culicifacies is abundant during summer (Feb – Mar) and peaks in rainy months (Jun- Aug) An. fluviatilis was endo and exophilic and it bites throughout night with a peak during 21.00 – 03.00 hrs whereas in cold season this changed to during 18.00 – 22.00 hrs. An. culicifacies was endophilic (Cattle sheds). Streams, rivers and paddy fields were the important breeding sites and the breeding sites were distributed upto 1700 m. from the village. The distribution shows a negative correlation with the distance.

An. fluviatilis was sensitive to DDT and Malathion and Deltamethrin and resistant to BHC, while An. Culicifacies was sensitive only to malathion and deltamethrin.

Drug resistance to chloroquine was not a problem with only 3.9% resistant; 1.3% at RI level and nil at RIII level.

Of the intervention strategies residual spraying had an efficacy as follows : DDT- with 70-80% coverage, gave a reduction in vector density by over 90% and reduction in malaria incidence by 80%; Bendiocarb: with over 80% coverage gave a reduction in vector density by over 90% and malaria incidence by 24%.

Insecticide treated nets, treated with Lamdacyhalothrin, Alphacypermethrin resulted in a 90% reduction in vector density; 50 –60% reduction in malaria incidence after a year, with widely ranging use rates of 20 – 90%.

Early treatment with Anganwadi workers ,Community leaders and volunteers and traditional healers was attempted. Performance of volunteers after 2 to 3 years showed drop-outs of 5 to 10% per year with volunteers of all types. Proper administration and reporting was over 75% with

volunteers and less than 2 percent with traditional healers. However with renewed efforts and the introduction of a pictorial guide their performance also rose to 75%.

Combined approach is ongoing at Malkangiri with DDT spraying – in high risk areas, the opening of additional Drug Delivery Centres and microscopic centres and prompt treatment for all fever cases.

Promotion of personal protection measures including the distribution of ITMN to primitive tribes and residential schools was also tested. Nets were distributed free and at 50% concession rates and its sales organised through sub-centre level counters. All this is accompanied by training and IEC activities at the village level. Some villages showed good acceptance while many initially had poor acceptance. Over time this could be changed in some villages.

Clarifications and Comments emerging during discussion:

- Drug Resistance –There is no need to look for it every where .Focus on area where there are reports of persons coming with repeated attacks.

- Replicability : 3-4 districts in Orissa have picked up this information. But VCRC has not been able to sustain these replication efforts after the transfer of the collector.The VCRC programme itself is limited to one sector.

- The basic lesson from the study was that information has to be demystified at the block, panchayat and the PHC level. One of the important lessons is that local level planning is critical.

- Early diagnosis and prompt treatment reduced the burden of suffering and deaths. It does not seem to have any effect in prevention of transmission.

- For VCRC, there was enough proof that even tribal people will access drugs if they are available. There is no significant reluctance from the population that was seen as contributing to programme failure.

4.Rapid Survey of Situation in Korba District :

Dr.K. Gunasekaran, Asst. Director, Vector Control Research Center, Pondicherry.

(For full text of paper see later chapter).

Korba district has a population of 10.21 lakhs spread over 5 blocks, and 792 villages. It has 5 CHCs, 27 PHCs, 197 sub-centers. There are 38 medical officers and 52 supervisors. Of the sanctioned posts of 197 MPW(males) and another 197 MPW(females), 118 and 120 respectively are in place .In addition there are 2815 depot holders and 228 malaria link workers. The reported API varies between 11.4 and 28.2.

The team visited 15 villages under three blocks of which 5 were riverine, seven hilly and three were of plains ecotype. Anopheles was seen to be breeding in rivers, streams, seepage sites, paddy fields and irrigation channels. Wells and ponds were not significant sites. There were 20 species of anopheles identified of which the predominant was culicifacies(32.4%). In very few sites fluviatilis (2.4%) was seen. A. annularis was seen in 9.4% .In the villages (population 3650) covered for a fever survey, 19 blood smear examinations were done in fever cases of which seven(36.8%) were positive – all Plasmodium falciparum.

A quick community perception survey showed that 52.3% were aware of the basic method of malaria transmission and over 70 % knew that it was a problem in their village and 81% knew who had the chloroquine depot. 100% resorted to government supplies for treatment as the first resort care. Personal protection measures were limited to various forms of smoke and there was little awareness and acceptance of spraying.

Secondary data analysis showed that 2 sectors in Pali,8 sectors in Korba block,4 sectors in Khatgora block and 8 sectors in Podi block and none in Kartala block had an API over 60, though all had a district wide API above 12. The monthly parasite incidence shows a varied pattern with one block having a August – September peak and two others showing a peak in November – December with or without a hump in the rainy season. On the whole the district peak was in December.

The study is limited by it being only a very quick assessment spread over a few days only. There was a need to go in for a longer study and pinpoint the main vector and its bionomics as well as understand the longitudinal pattern over the year.

Questions emerging during discussion:

1. Can we conclude that culicifacies is the predominant vector? . What is its sensitivity to insecticides.

2. Why is there a winter peak? And is there a trough in September – October? – Is it because of An fluviatilis peaks then, or increase in biological efficiency of mosquitoes due to longer life span or the development of new secondary breeding sites after the rain-water has drained off?

24th January:

SCIENTIFIC SESSION 3:

RELEVANT STUDIES FROM THE CHHATTISGARH AND NEAR CHHATTISGARH AREAS:

1.Vector bionomics in 5 blocks of Raipur district.

Vandana Dixit, School of Life sciences, Pt. Ravishanker Shukla University,:

This study had only begun and this was in the nature of an interim report. The aim of the study was to study species composition, seasonal distribution and impact of climate on vector density and associate this with prevalence of malaria. The five blocks chosen for the study were Chhura, Fingeshwar, Gariaband, Mainpur and Raipur . The study showed maximal indoor resting density of A. culicifacies and next A. annularis with relatively no A. fluviatilis. Other parameters were under study.

2.Hemoglobinopathies- Sickle Cell Disease and thallessemia" in relation to malaria in tribal areas of MP.

Dr. RB Gupta,Asst Director, RMRC, Jabalpur.

Sickle Cell Disease(SCD) is found in India in Madhya Pradesh and Chhattisgarh and its adjoining areas of Maharashtra, Andhra Pradesh, Orissa .It also occurs in indigenous populations of the Nilgiris. Beta thallesemia (Bthal) and G6PD deficiency is also relatively common in these areas. Within the communities living in this area SCD is more common in scheduled castes, less in Gonds and not very common in the primitive tribes. Beta thallessemia and G6PD deficiency on the other hand is commoner in primitive tribes and in indigenous populations as compared to others. The primitive tribal populations in MP-Chattisgarh area are the Saharias, (HbS

0.9;Bthal-6.6)the Hill Korbas,(SCD-0, Bthal 10.4%) the Bharias(HbS 0.0;Bthal 12.2), the Baigas,(SCD 22.5%, Bthal 3.5%); the Birhore, (HbS 0, Bthal 18.6)the Kamar(Bthal 18.6) and the Abujmaharias(HbS 22.0, Beta thal ND). The sickle Hb gene in India differs from that, in the rest of the world and other genetic factors are also proposed. Clinical types range from mild to severe and there is a need for proper study so that facilities for diagnosis, management and prevention can be established at district and block level.

These hemoglobinopathies are stated to provide protection against Falciparum malaria in the heterozygous state and studies in Africa have suggested protection against cerebral malaria also. Given the high prevalence of these disorders in the indigenous population in a state historically endemic for malaria there is need to study the association further. Studying the incidence of Falciparum malaria, the parasite density and its outcomes in heterozygotes of HbAs, Beta-thalessemia trait and alpha-thalessemia trait could help understand the relationship. It was proposed to screen a population of about 4000 in 8 villages for haemoglobinopathies as well take up a cross-sectional study of some 200 to 300 persons with Hb S and another group with alpha thalessemia type II.

3. The Ghadchiroli Situational analysis:

Dr RC Dhiman, Deputy Director, Malaria Research Center, New Delhi.

This study was done in 2001 in Ghadchiroli district of Maharashtra a district bordering the districts of Kanker,Bastar & Dantewada in Chhattisgarh. Its population is 9.92 lakhs and it has 1661 villages in twelve taluks. There are 46 PHCs of which 17 are high risk. The API in 2001 was 15.7 with a 60% Pf ratio.

Malaria cases are in their lowest in April, May and June, start rising in July, plateau in September, October, and peak in November, December, then declining steadily to the summer low. An. Culicifacies is the main vector though An. Fluviatilis was also seen in one of the four PHC areas examined. Mosquitoes were susceptible to deltamethrin but not to DDT. Fever survey showed a 100%

falciparum prevalence. 68% were below the age of 15 and 27% were below the age of 5.

In conclusion some of the major problems for persisting high levels of transmission in Ghadchiroli are the outstanding operational problems in malaria control; inadequate surveillance; poor health seeking behaviour and lack of an early warning system.
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Of the operational problems those highlighted were the difficult terrain and vacant posts of health workers. Non-availability of inhabitants in houses and the distance of health posts from village were other problems. Lack of motivation of health workers was also another significant problem. The reasons for the malaria epidemics were unexpected heavy rains and a lack of adequate surveillance and early warning systems. Epidemiological data needed to be analysed and charted monthly but the data that was available was not analyzed monthly. The development of insecticide resistance also contributed in a major way.

There was a need for long term epidemiological studies to find out the sites and peak of transmission and transmission risk factors.

4. NAMP/NICD/MRC- Joint Tour Report – A Situational analysis.

Dr R.Panda, Asssitant Director, National Insititute of Communicable Disease – Jagadalpur,

The tour was undertaken for a rapid situational analysis from 5th to 9th December 2000 by a joint team of the above institutions at the chief ministers request. As an important effort and documentation of the anti malaria efforts of the state made during epidemic conditions this report was presented. The team visited three districts- Bilaspur, Korea and Korba. The main finding s were that the malaria situation had stabilised at a very high level. The disease was now almost completely of Plasmodium Falciparum.

As per the records focal spraying of 50% was undertaken but most villages met reported no spraying in last 5 to 6 years. A 2 to 50% backlog of slides for examination was observed. And only 90 posts of malaria inspectors and 158 posts of lab technicians are sanctioned against a required strength of 150 and 950 respectively.

The recommendations included filling up of vacancies, more efforts at rapid case detection, the introduction of rapid malaria diagnostic kits, studies on vector and parasite susceptibility to chemicals used against them and enhanced community participation. There was also a specific recommendation for creating one state level entomologist and three assistant entomologists and improved surveillance work by them.

SCIENTIFIC SESSION 4:

BASIC READINGS IN VECTOR CONTROL.

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1. Insecticides – A key issue for Vector Control:

K.Raghavendra, Sr. Research Officer, Malaria Research Center, New Delhi.

Present day vector control strategy in India is mainly by use of synthetic chemical insecticides of different groups. These are in use selectively for different intervention measures. Such as indoor residual sprays, anti larval measures and as impregnant on mosquito nets.

Six anopheline species are responsible for the transmission of malaria in defined ecotypes. Of these six species anopheles culicifacies is responsible for 60 to 70% of malaria cases in rural areas each year and is multi resistant to all the insecticides in use in public health. Another species, anopheles fluviatilis is responsible for 15% of new cases in hills and foothill regions. However this species is mostly susceptible to insecticides used in public health. Insecticide resistance is a genetically inherited character by selection with insecticides and depends on biological and operational factors. Presently vector control options are no more sustainable on strategies involving use of chemicals and there is a limitation of new molecules. Only viable option will be management of insecticide resistance in vectors rather than managing the insecticide resistant vectors. For this strategy a proactive approach is essential.

2. Transmission Dynamics:

Dr.K. Gunasekaran, Asst. Director, Vector Control Research Center, Pondicherry.

(For full text of paper see later chapter).

Transmission dynamics and control can be seen as having three components- the vector, the host and the parasite. Control aims at reducing man vector contact by reducing

vector or merely preventing contact. Parasite control is mainly curative but by itself has limited preventive role. Vector control gains are difficult to attain but more sustained.

•Vector control tools are broadly adequate but their application needs to be in a proper manner , time and place. Choice of methods would depend on whether the vector is anthrophilic or zoophilic, and indoor resting or out door resting and its peak time of biting and the vectorial capacity of the predominant vector species. The methods used should be selective instead of common and we need a change from overkill by pesticides to eco-friendly integrated vector management . This in turn requires intersectoral collaboration and community participation.

In personal protection there are a lot of natural and synthetic substances available and each has their advantages and limitations. Mosquito nets can provide community level protection only if they are insecticide impregnated.

Advantages of insecticide treated nets are that they irritate or kill mosquitoes on contact, preventing them from finding openings. They also make the mosquitoes that survive the contact with insecticide, so disturbed that they are unlikely to attack again. They offer protection to people who sleep outside a net but near someone with a treated net. They are very useful for protecting the vulnerable group like pregnant women or children. They also kill other biting insects – bedbugs, head lice, chicken ticks, and houseflies – thereby enhancing community acceptance.

SESSION – 5:

GROUP WORK AND PRESENTATION OF GROUP RECOMMENDATIONS:

Participants were divided into three groups. Each group had members drawn from programme managers, from malaria researchers and from other invited professionals and civil society section. The three groups were on the three different dimensions of malaria control – Vector control, Personal Prophylaxis and Early Diagnosis and Prompt Treatment.

The group work objectives was as follows:

•Define the constraints in current programme management which need to be kept in mind for better operational outcomes.

•Define the needed "locale specific knowledge" required and level of requirement for better operational decisions.

• Define the Research Question where there is a knowledge gap with operational implications for malaria control.

Group 1: **Vector Control** :

The main constraints were :

a. resource mobilisation, and that too on time(men , money, materials)
b. inadequate training and
c. lack of community participation.

With specific reference to spraying the action needed to overcome constraints were

a. filling up of vacant posts;
b. Training at all levels;
c. Adequate supervision,
d. Transport facilities;
e. Improved house/room coverage;
f. Strict adherence to time schedule and
g. IEC for active community participation.

The key research input needed is the mapping of susceptibility status of vectors to commonly used insecticides. Longitudinal studies on vector bionomics were also needed to tune vector control measures better. Environmental measures that need special attention is lining of irrigation channels to prevent seepage and channelization of seepage water. Environmental safeguards during any developmental work, once so well recognised needs to be emphasised again.

Larvivorous fish are best suited for wells and ponds. The constraint is the local availability of technical know-how for rearing, maintenance and release of fish and Periodic monitoring for effectiveness and restocking, if necessary. The key research question is the inter-specific association of Gambusia fish with local breeds. Lack of active involvement of community was one more constraint. There was a need for further KAP studies in assessment of the local community towards malaria and malaria control. Another research need was to evolve suitable mechanisms to assess the impact of IEC/advocacy in behavioural changes in the community.

An operational research input to study ways of securing community participation and optimising on its contributions was another need identified. In view of the repeated scarcity of insecticides compounded by different levels of vector resistance to insecticides, a careful epidemiological risk stratification of villages linked to a basic understanding of vector bionomics and resistance patterns would improve effectiveness even at current costs.

Group II work : Early Diagnosis & Prompt Treatment.

The main constraints for early diagnosis were the vacancies of MPWs and the overburdening of those on the job. Microscopy is needed at every sector level but often it is available only at the block level.

Problems in transportation also added to making it impossible to ensure prompt BSE. Thus in practice even one month could elapse between making the smear and getting the report.
In treatment the constraints noted were that FRT is not being adhered to as even MPWs fear administering

complete dose of anti malarials. Usually chloroquine is given , but not primaquine.
Private practitioners are not aware about NAMP drug policy for malaria treatment. And though the status of resistance to chloroquine in Plasmodium Falciparum is not known mefloquine is being administered without knowing the status of resistance.

In research questions we need to begin with a better estimation of the actual burden of malaria incidence. It is alos important to research the advantage of presumptive radical treatment over limiting Radical treatment to smear positive cases , in a context where BSE is available within 24 hours. The group felt that FRT should be seen as a measure only where the system fails to generate a BSE report within 24 to 48 hours. The focus of efforts should be on achieving the latter.

The group strongly recommended that all MPWS post should be filled and there should be a laboratory technician in every sector and all supervisors and MPWs should be trained in laboratory work too. Treatment training for all health care providers in private and public sector was mandatory.

The pattern of plasmodium sensitivity to chloroquine was not known though a number of district officers and BMOs had been trained to study this. There is a need for a coordinated study in all areas where this is suspected.

Mortality is consistently seen in all tertiary care and even secondary care institutions that however are not included within the malaria statistics due to various technical reasons. The need is to find out why some cases do worse – is it merely delay in onset of treatment, or is there drug resistance, or are there host factors that predispose. A case control study could address this issue.

Surveillance was another major issue discusses especially in the context of epidemic management. One suggestion was that in addition to ongoing surveillance programmes we need a NATHI type disease sentinel surveillance programme which would involve the private sector and tertiary care centers. (refers to the North Arcot and Tiruvannamalai Health Intelligence programme run by CMC, Vellore).In this programme a number of private health care providers

are recruited and provided with printed post cards. Prompt action when cases are reported and feedback to reporting doctors has helped sustain reporting over a decade. In a context where at least 80% of clinical care are in the private sector, public private partnership on surveillance is essential.

Group III work:
Personal protection measures-

Considering the limitations/ constraints with vector control options, preparing community for personal protection is essential. Almost all houses use various smoke of plant origin to reduce at least nuisance from mosquitoes, even if not malaria. A better knowledge of actual effectiveness of these options over the night would help optimise choices.

On Indigenous options there are many measures being tried but we need to have more information on their effectiveness. Eg on Neem+ Mustard oil combination, the Mosbar Soap, the Fumigation with neem smoke etc.

The appropriate strategy of Marketing of nets and repellents needs to be worked on. A network of marketing outlets with backward linkages to local manufacture of low cost appropriate options needs to be explored. The haats are natural sites for marketing outlets- The policy for training, support, working capital and subsidy for these outlets need to be evolved.

In the introduction of bed nets we need to set criteria for delineation of areas? Do we focus on all high-risk areas or those refractory to spray? Do we target for high risk groups? Or specific transmission seasons? How do we look at living conditions of target population for such choice and finally what is the strategy of supply and re-impregnation.

The department of malaria supplemented in the plenary discussion on what has been done in the area of ITMN in the pilot block of Marwahi.
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SCIENTIFIC SESSION – 6:
CULTURAL CONTEXTS AND IEC

1.Knowledge, Attitude and Practice towards Malaria in Rural Tribal Communities of South Bastar District.

Dr R.Panda- National Institute of Communicable Disease, Jagadalpur Branch.(co –authors LJ Kanhekar and DC Jain).

A sample survey of 100 household heads was carried out in Bastar district to assess villagers knowledge, attitude and practice(KAP) about malaria and their implications for malaria control. Results show that 64.4% of respondents were illiterate and only 20.6% of respondents know the factor for cause of malaria through 45% of household heads received some form of health education from various sources.

Respondents who suffered from malaria in previous year constituted 35.8% while respondents reported for treatment to nearby PHC, 59.1% respondents admitted the responsibility of male head- of –family to take decision to seek health care malaria. About 34.6% of respondents suspect malaria for any fever. A meagre respondents 8.2% knew the drug for treatment of malaria and the majority of respondents(70.9%) had taken a complete course of malaria treatment. About 55% did not take any measure to prevent mosquito bite, while 92.4% admitted that they had not taken any measures to prevent malaria. Almost all respondents(99.7%) agreed to allow their houses for spraying and the majority (99.1%) thought that spraying was necessary. The study shows, for successful control of malaria in tribal areas, proper health education about the disease, awareness of personal protection and preventive measures against malaria should be carried out in such a way that it should be need based, suitable for the area concern and acceptable, along with active involvement of the communities.

Clarification and Comments emerging during discussion: There was some discussion about the data and the level of knowledge of tribals. Other experiences and studies had different outcomes . Whether the methodology was adequate to capture tribal perspectives was also discussed.

2. **Discussion on cultural contexts**:

Leading the discussion Dr Sanjeev Chakravarthy , Adviser DSU stated that often IEC is seen as something that is appended to the main programme rather than being integrated with it. IEC plans should be laid out along with the main plan and its implementation should precede other dimensions of interventions. Thus impregnated bed nets get planned but without IEC they do not get used or are used for other purposes.

Ira Saraswat emphasised the need for culture specific studies especially in the context of the ethnic diversity of this state. Structured questionnaire based studies like the KAP approach could not capture many dimensions which only carefully designed qualitiative sociological and anthropological studies could bring out.

Others also spoke emphasising the need for IEC. District malaria officers explained present IEC components in their programmes especially in the Durg campaign.

SESSION 7:
COMMUNITY PARTICIPATION AND LOCAL LEVEL PLANNING IN MALARIA CONTROL

Dr T.Sundararaman, Director, State Health Resource Center, Raipur.

Community participation in malaria control is well accepted principle. There have been many such programmes in the past with varying degrees of success and sustainability. The Mitanin programme is an attempt to learn from and improve upon the past experience for community basing of health programmes. The basic objectives of the Mitanin programme is to improve health awareness, increase utilisation of health services and involve organised womens groups and Panchayats in collective local action for better health care. The key strategy is to identify and train a volunteer in every one of the 54,000 hamlets of the state and support her to ensure effective her functioning. This volunteer known as Mitanin acts as a local organiser of collective action. With specific reference to malaria control the effort being made is to go through a guided collective planning process at the panchayat and hamlet level on malaria control where every element of existing government inputs are understood and their use optimised even as collective local action is initiated on vector control and improved access to personal prophylaxis. Thus typically a village may decide to invest in expediting slides for BSE and getting reports in time. It may open marketing outlets for prophylactics and it may undertake to identify and manage vector-breeding sites. To do this instructional material has been constructed.

There is a need to study the impact of various elements of intervention in terms of outcomes, and overall impact on disease transmission and what is needed to improve the se outcomes. There is specifically a need to understand vector bionomics better and develop guidelines that can help optimise local vector control interventions.

Other than these there are four key operational elements that must be incorporated for a sustained panchayat level planning process to get established as a viable long-term approach to malaria control. First is the necessity of using participatory processes at the grass roots level. Second is to focus on malaria but not ignore other public health dimensions as perceived by people and to reserve one component of the

funding as un-tied. Third is to address one inter-sectoral area related to health- minor engineering, irrigation, food security- so that the planning process does not become mere delegation of work. And finally and most important is the need to facilitate the process by trained persons enabled to interact and build capabilities of the local planners.

Questions, Comments and Consensus Emerging during discussion: The general approach was welcomed. Other examples of Community participation were mentioned. The constraints with schemes like link workers and village health guides had faced were discussed and how the Mitanin programme sought to overcome these constraints was explained. Vector control may be difficult in rainy seasons where the focus would have to be on individual prophylaxis and EDPT. After the rains the water drains away leaving a much lesser number of sites that may be easier to access depending on the terrain. If this could be done effectively it would leave us with seasonal malaria confined to rainy seasons instead of malaria all year around. Longitudinal studies and analytic process documentation would be needed to improve on outcomes. The scale of intervention would be the maximum possible but at least in some places detailed documentation is needed so that we have data that we can learn from.

25TH MORNING :

SESSION 8:

FINALISATION OF WORKSHOP RECOMMENDATIONS:

After all presentations a drafting committee was set up consisting of Dr Sundararaman, Mr Om Kataria, Dr Jambulingam, Dr Raghavendra and Dr Singh and Dr Madanagopal to finalise the workshop recommendations. This committee presented its draft to the plenary on the 25 th morning and after careful discussions the recommendations were finalised. To keep it succinct the main recommendations were short , followed by a more detailed explanatory note for each recommendation. The research questions and short-listing research projects and follow up on that could not be taken up as the participants had to proceed to the valedictory session.This was done subsequently in session 9.

SESSION 9:
FINALISATION OF RESEARCH QUESTIONS AND SHORT-LISTING RESEARCH PROJECTS:

After the formal closing the participants took another two hours to go through the listing of the research questions and then shortlist a number of questions for immediate writing up of project proposals. As Om Kataria had to leave the department's contribution was proposed but not finalised.

Research Input Needs identified by the workshop:

- Determining susceptibility status of vectors to commonly used insecticides
- Determining drug sensitivity status of malaria parasites in areas reporting treatment failures.
- Inter-specific association of Gambusia fish with local breeds
- Assessment of KAP of the local community towards malaria and malaria control
- Evolving suitable mechanisms to assess the impact of IEC/advocacy in behavioural changes in the community
- What is the exact/ actual burden of malaria incidence- especially in view of many cases going to private sector? How many cases per sub-center- area go to a private sources only/also?
- What is the cost effectiveness of FRT as compared to Radical treatment limited to only microscopically proved positives.
- What is the efficacy of various indigenous mosquito repellent options?
- What is the relative efficacy of different strategies to promote the use of personal protection measures? – both as regards distribution/marketing and as regards behavioural change?
- What are the barriers to the use of nets? What is the comparative effectiveness of different approaches to behavioural change?
- What selection criteria or distribution mechanisms maximise utilisation of bednets? Especially, if they are to be supplied free!

- What is the best way to get regular data inputs from the private sector ? How viable is a NATHI type model for getting information.
- Why does malaria peak in winter ? What is the transmission dynamics of malaria in different eco- types i.e. hilly forested and plains ?
- What are the transmission risk factors and in a combined control approach what is the relative contribution of each element alone and together in transmission reduction.
- To what level is community based local planning for malaria control effective as health education and in vector control and in reducing malaria indices. What are the ways to optimise community based interventions and to what extent are various forms of bio environmental control effective?

Research Projects Shortlisted for immediate implementation.

a. Study using common protocol to map vector resistance patterns.

b. Study using common protocol to study drug resistance pattern in all districts.

c. Study on larvivorous efficacy of indigenous fishes and their inter-specific association with Gambusia fish.

d. Concurrent process documentation of the introduction of impregnated bed nets in a community.

e. Evolving an IEC strategy to go along with impregnated bed net introduction.

f. Documentation of and evaluation for effectiveness of various indigenous personal protection measures.

g. Study on vector bionomics in relation to transmission dynamics of malaria(One specific question that has a focus within this area is the winter peak of Malaria in Chhattisgarh, its determinants and their control implications).

h. Multi - centric hospital based case-control epidemiology with reference to associations of severe forms of malaria and mortality in malaria.

i. Operational Research to document processes and relate them to outcomes for a Block level malaria control plan based on local planning and community participation- as suggested in the recommendations.

VALEDICTORY SESSION:

The honourable minister of Health, Government of Chhattisgarh was the chief guest. Ms Ishita Roy, collector, Korba gave an introductory address where she outlined the main areas of discussion of the workshop and the immediate relevance to what action they would take up. Then she called on the minister to give away the mementos to the scientists who had come all the way and participated in the workshop.

Dr Madanagopal, adviser DSU spoke next announcing the workshop recommendations. Dr Sundararaman elaborated on the recommendations and explained the importance of the research questions for malaria control. He also explained that the immediate programme level change would be the emphasis on panchayat and village level planning as the form of community involvement.

In his guest oration the minister outlined the health programmes that his government had undertaken and the seriousness with which the malaria programme was being addressed. The strengthening of the monitoring system was an important measure. As a result the incidence of malaria had come down but this decline had to be sustained. Welcoming the participation of the scientists and thanking them for their contributions, he promised to open a malaria research section under the State Institute of Health and Family Welfare that was coming up.

Dr Sisodia, District Malaria officer , Korba proposed the vote of thanks.

OBJECTIVES OF THE WORKSHOP

A background note:

Malaria is an old enemy. It is estimated that at independence the disease incidence was anything from 70 million to 100 million persons. With a population of about 400 million that was a very high figure. Some of the existing foci of disease today- like Chhattisgarh or even Madras, was well acknowledged as foci and discussed in literature even a hundred years ago. Malaria in this area appears in published literature as malaria along the Bengal- Nagpur railway.

This is not to state the invincibility of the disease. Many historical foci have disappeared – both in India and abroad- and never reappeared again. We need to identify the causes for a sustainable malaria control strategy as different from ephemeral success stories. In India as a whole the remarkable decline of malaria to less than 100,000 cases by the early sixties – and out come of the "war on malaria" approach is a dramatic success story. The credit of this success is partly due to the widespread introduction of DDT. But the considerable political and administrative will that went with the campaign and the strong system of surveillance and reporting that went with it was equally responsible for the success.

Subsequently by the late sixties the situation had begun to worsen and in the early seventies the problem had reached epidemic proportions again with over 9 million affected. A revised "Modified Plan of Operation" was formed and a three-pronged strategy was put in place –

a) Government efforts focussed on spray and surveillance operations.
b) Public participation – through voluntary agencies for collection of blood smears and drug distribution centers, cooperation in spraying and disease reporting
c) Operational and Fundamental Research.

However in practice the programme remained the earlier approach with little operational research happening and even less public participation but with some amount of administrative improvements.

The reported figures of malaria dropped to 3 million but the considerable under-reporting and the stubbornness with which the disease has stuck at this level has led to a permanent

stale mate. Subsequent programme design changes, - Falciparum containment plans or Roll back malaria schemes or Enhanced malaria control programmes have seldom been able to go beyond the main strategies of the modified plan of operation or modify the status of malaria in our country.

A quick listing of the main constraints that the system has attributed as causes to this stagnation of the war would help-

a) Tight or declining financial outlays against an increasing operational cost for the programme.
b) Poor “peace- time” administrative management - incorporating administrative controls into a system.
c) Developing insect resistance and drug resistance
d) Poor health awareness and public cooperation.

However at another level of discourse the problem has been held to be the approach itself- a faulty design – neither human error nor natural causes being held primarily responsible.

In this analysis the main and crippling constraints of the current designs are

1. Basing the entire strategy on a limited technological option- spraying and presumptive chloroquine- instead of a mix of options centred around bio- environmental vector control. The latter may be more difficult to achieve, but it would be more sustainable.
2. A top- down administration driven approach where the technological fixes are applied mechanically instead of a community centred approach where a mix of the appropriate technologies are chosen by an informed community and which options they can access at ease.
3. A disease surveillance system that functions as part of a comprehensive district level health planning system rather than as reporting to a distant centre for administrative action.

Much of the elements of the latter discourse has been incorporated at the level of technologies into the earlier paradigm without incorporating the processes- giving rise to the current programme designs and their unique problems. This tighter administrative control has come to mean prompt disciplinary actions which at one level may have caused more intense activity but at another level has led to institutionalising underreporting especially in deaths. This

is turns makes disease surveillance less effective for knowing both programme outcomes and disease status. Bioenvironmental control has been incorporated as a widespread introduction of Gambusia the effectiveness of which even where it succeeds as an activity needs to be studied. Presumptive chloroquine has graduated into presumptive radical treatment with primaquine administered by depot holders – unsupported by any evidence and completely neglectful of possible adverse consequences.

Earlier diagnosis has been addressed effectively by increasing supply of microscopes and training and deploying many more laboratory technicians. Though due to operational snags they are not yet effective at field level the potential to make them so has certainly been created. This round of revision is certain to make some dent on figures at the short term, but is it sustainable?

It is in this context that this workshop is being held. Many of the plans implemented today are designed at distant locations and there has been little control the block, the district or even the state has had over it. Yet over the years the state has developed a number of persons with expertise in this area and with some building on this it is possible for state level planning for sustainable malaria control to emerge. There is also a considerable under-utilised capacity of malaria researchers and institutions who are willing to contribute to such a planning effort. There is also the context of the Mitanin programme, which is becoming an idiom of health sector reform especially the community basing of health programmes.

State level planning for Sustainable Malaria control is however a presumptuous goal at this stage. For one we do not have the data- base – neither epidemiological, nor entomological, nor even clinical data- base we need to make a meaningful plan. Secondly the answer is not another hastily drawn up administrative programme. We need to have evidence that the new approach works – evidence grounded on solid operational research.

Though smaller models are welcome the operational research model on which future state plans would be based must be replicable and scalable to the state level- which would mean at least a block(perhaps sector level) as the unit of planning and implementation.

Though we do not rule out insights from the three days to modify ongoing programmes this would not be the goal. The goal is really a state level plan for sustainable malaria control to be drawn up in 2004 or even 2005 for which we begin laying solid foundations today.

The objectives of this workshop have therefore been identified as the following :

1. To understand the situation in malaria and the ongoing malaria control programme in the state of Chhattisgarh
2. To identify key areas where there are problems and bottle necks in programme implementation .
3. To identify key epidemiological and entomological questions that need to be studied further.
4. To identify the database requirements and surveillance mechanisms for adequate district level planning and state level planning on malaria control.
5. To plan for studying the social –biological interface of disease and disease control in the context of different cultural and ethnic groups and geographic areas.
6. To understand the possible contributions that community participation and local planning can make in the area of malaria control.
7. To build operational research models to validate different programme approaches.
8. To build collaboration between vector control and malaria control institutes and the state health department of Chhattisgarh for planning and implementing further studies.

We hope at the end of the workshop to generate three types of outcomes:

1. Block/or sector level operational research models along with research collaborators
2. Research programmes addressing key questions in social , clinical epidemiological or entomological areas where definitive answers are needed for future planning
3. Recommendations to current programme where appropriate and considered feasible within programme constraints.

The workshop is therefore planned to have three types of sessions-

1. Input sessions for a presentation from invited scientists to learn about specific technical dimensions.
2. Input session from programme managers to learn about field constraints experience.
3. Group work and plenary discussions to work out action plan elements towards the three types of workshop outcomes identified above.

Dr. T. Sundararaman,
Director, State Health Resource Center.

Dr K Madanagopal,
Adviser, Danida Support Unit,

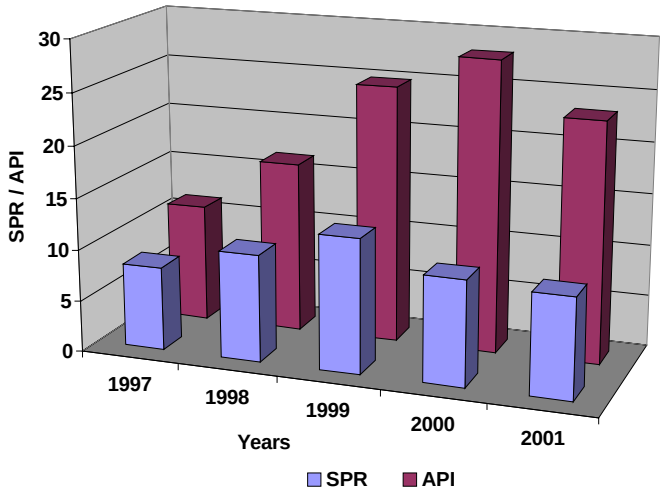
SITUATION ANALYSIS OF MALARIA IN DISTRICT KORBA, CHHATTISGARH STATE,

Vector Control Research Centre, Pondicherry,

Korba district is one among the 16 districts of Chhattisgarh State, which was part of the erstwhile Madya Pradesh and has become an independent State since 2000. The district is known for coalmines and thermal as well as hydroelectric power generation. It is bordered by Orissa and Jharkhand in east, Maharashtra and Madya Pradesh in west, Uttar Pradesh and Jharkhand in north and Andhra Pradesh in south. Population of the Korba district is 10,12,221 and of which 75.7% are from rural areas. Literacy rate of the population was 39.4%. The Korba district consists of 5 Blocks and each Block has one CHC. There are 27 PHCs with 197 Sections distributed in the 5 Blocks. At grass-root level, in addition to Multipurpose Health Workers, Depot Holders, Malaria Link Workers (MLW) and Mitanin carry out malaria control activities.

Malaria has been endemic to Korba district since many years. The API and SPR recorded during the last five years (1997 – 2001) varied between 11.4 and 28.2 and 8.1 and 12.9 respectively (Fig. 1). *Plasmodium falciparum* is the predominant species constituting around 60% of the total malaria cases. Total number of recorded deaths due to malaria during the last five years was 28 despite the control measures such as parasite control by administering anti-malarial drugs and vector control by doing indoor residual spray using DDT/synthetic pyrethroids.

Fig.



Therefore, it has become necessary to analyze the reasons for the persistence of malaria, to understand the transmission dynamics and to formulate suitable control strategies/ strengthening the ongoing programmes.

At the invitation of the District Administration, a team, with the following as members, from the Vector Control Research Centre, Pondicherry, one of the permanent Research Institutes of Indian Council of Medical Research, visited the Korba district from 20th to 25th January 2003 to conduct an epidemiological investigation and suggest remedial measures for the control of malaria in an effective manner.

Investigation

The team visited a total of 15 villages under three Blocks (Table 1) during the investigation. A cross-sectional interview from 35 persons was conducted (Plate 1a) using a semi structured questionnaire to assess their perception of malaria problem -knowledge on malaria and its symptoms, spread of malaria and their opinion on availability of chloroquine in their villages and DDT spray.

Entomological surveys for the prevalence of anopheline species in general and malaria vectors in particular were carried out using light traps (Plate 1b) in both human dwellings and cattle sheds as well as collecting the mosquitoes resting indoors (Plate 1c) in the villages that were visited during the investigation.

Mosquitoes were dissected and examined in the field laboratory for parasite infection and parity status (Plate 2a). Surveillance was also conducted in the villages and blood films were collected from the fever cases (Plate 2b) and examined for malaria parasites.

All the fever cases were administered presumptive radical treatment.

Table 1. Villages/Blocks visited by VCRC Team in Korba district, Chhattisgarh State

Sl.No.	*Block*	*Sub-Centre*	*Village*	*Ecotype*
01	Korba	Korba	Kolga	Riverine
02	-do-	-do-	Pasalkhet	Riverine
03	-do-	Lemru	Lemru	Hill top
04	-do-	-do-	Kutubara	-do-
05	-do-	-do-	Deopahadi	-do-
06	Pondiuproda	Podi	Konkona	Riverine
07	-do-	Gursia	Surbhoka	Plain
08	-do-	-do-	Mangnapahar	Riverine
09	-do-	Aitma	NanLepra	Hilly
10	-do-	-do-	Mutheni	-do-
11	-do-	-do-	Aitma	-do-
12	-do-	-do-	Jhawar	-do-
13	Khatgora	Nawagaorikla	Chanpara	Plain
14	-do-	-do-	Lotlota	-do-
15	-do-	Chhuri khurd	Jhona	Riverine

Findings

Mosquito species diversity

Mosquitoes belonging to four genera viz. *Anopheles, Aedes*, *Armigeres* and *Culex* were recorded in the Korba district during the investigation. Genus *Anopheles* was represented by 20 species, *Aedes* by 3, *Armigeres* by one and *Culex* by 11. The list of *Anopheles* species recorded and relative proportion of each species are furnished in Table 2. *An. culicifacies* was the predominant species constituting 32.3% of the total anophelines collected followed by *An. splendidus* (15.7%) and *An. annularis* (9.4%). The proportion of *An. fluviatilis,* one of the efficient malaria vectors in India was 2.4%. Rare species like *An. sinensis*, *An. karwari* and *An. gigas* were also encountered. According to reports, *An. culicifacies* and *An. fluviatilis* transmit malaria in other parts of Chhattisgarh State while *An. annularis* is a vector in the adjoining State, Orissa.

Table 2. Anopheles fauna of Korba district, Chhattisgarh district

Types of collection	*Sl. No.*	*Species*	*Number collected*	*Relative proportion (%)*
Diurnal resting, Nocturnal resting, Light trap Cattle biting & Larval samples	1	***An. culicifacies***	82	32.3
	2	***An. annularis***	24	9.4
	3	***An. jeyporiensis***	5	2.0
	4	***An. subpictus***	5	2.0
	5	***An. jamesi***	12	4.7
	6	***An. theobaldi***	17	6.7
	7	***An. fluviatilis***	6	2.4
	8	***An. splendidus***	40	15.7
	9	***An. pallidus***	11	4.3
	10	***An. barbirostris***	7	2.8
	11	***An. vagus***	11	4.3
	12	***An. varuna***	2	0.8
	13	***An. nigerrimus***	4	1.6
	14	***An. pseudojamesi***	12	4.7
	15	***An. peditaeniatus***	6	2.4
	16	***An. sinensis***	3	1.2
	17	***An. aconitus***	1	0.4
	18	***An. philippinensis***	3	1.2
	19	***An. karwari***	2	0.8
	20	***An. gigas***	1	0.4
	Total		254	100

Mosquito larval habitats

The investigation revealed presence of 12 types of habitats and among them nine were found with anopheline immatures (Table 3). *An. culicifacies* larvae/pupae were found in streambed pools (Plate 3a), riverbed pools (Plate 3b), paddy fields (Plate 3c) and irrigational canals (Plate 4a). Immatures of *An. fluviatilis* were obtained from streambed pools, reservoir (Plate 4b) and rock pools (Plate 4c). However, breeding habitats of *An. annularis* could not be listed as no adult emerged from the immature samples collected from any of the habitats surveyed (Table 4).

Table 3. Larval habitats of *Anopheles* mosquitoes in Korba district

Sl.No.	*Habitat*	*Number surveyed*	*No. positive with larvae*	Remarks
01	River-bed pool	28	13	With algae
02	Seepage pool	8	4	Seepage from springs, ponds and wells
03	Paddy field	13	7	Newly transplanted
04	Stream	3	2	Slow running
05	Rock pool	4	4	-
06	Stream-bed pool	7	5	-
07	Irrigation canal	1	1	-
08	Reservoir	2	2	With grassy margins and algae
09	River	1	1	Slow running
10	Burrow pit	1	0	With turbid water
11	Pond	1	0	-
12	Well	11	0	Clear water & under use

Table 4. Distribution of different *Anopheles* species in larval habitats

Sl. No	*Species*	*Stream bed pool*	*Seep-age pool*	*River-bed pool*	*Paddy field*	*Rese-rvoir*	*Rock pool*	*Irriga-ti-on canal*
1	***An. culicifacies***	⊙		⊙	⊙			⊙
2	***An. annularis****							
3	***An. jeyporiensis****							
4	***An. subpictus****							
5	***An. jamesi***		⊙					
6	***An. theobaldi***	⊙		⊙				
7	***An. fluviatilis***	⊙				⊙	⊙	
8	***An. splendidus***	⊙	⊙	⊙	⊙			

9	***An. pallidus****							
10	***An. barbirostris***	⦿						
11	***An. vagus****							
12	***An. varuna****							
13	***An. nigerrimus****							
14	***An. pseudojamesi***	⦿	⦿		⦿			
15	***An. peditaeniatus***	⦿	⦿		⦿			
16	***An. sinensis***				⦿			
17	***An. aconitus****							
18	***An. philippinensis****							
19	***An. karwari***	⦿	⦿					
20	***An. gigas***				⦿			

* No adult emergence from the larval samples

⦿ **Presence of larvae/pupae**

Collection of adult mosquitoes

Nocturnal resting collections yielded 17 Anopheles species of the total 20, including the three known malaria vectors. While both *An. fluviatilis* and *An. annularis* were also collected from diurnal indoor resting and light trap collections, *An. culicifacies* was not obtained from light traps. This information may be useful to design entomological monitoring for assessing the impact of any intervention measures in this area. *An. karwari* and *An. gigas* were not obtained from any of the collections (Table 5).

Table 5. Number of different *Anopheles* species collected (⊙) from different types of collections

Sl. No		*Diurnal indoor resting*		*Nocturnal resting*	*Biting*		*Light trap*	
		HD	*CS*		*Human*	*Cattle*	*HD*	*CS*
1	***An. culicifacies***	⊙	⊙	⊙				
2	***An. annularis***	⊙	⊙	⊙		⊙	⊙	⊙
3	***An. jeyporiensis***			⊙			⊙	⊙
4	***An. subpictus***		⊙	⊙				
5	***An. jamesi***			⊙				⊙
6	***An. theobaldi***			⊙			⊙	⊙
7	***An. fluviatilis***	⊙		⊙			⊙	
8	***An. splendidus***	⊙	⊙	⊙		⊙	⊙	⊙
9	***An. pallidus***	⊙	⊙	⊙			⊙	
10	***An. barbirostris***	⊙	⊙				⊙	⊙
11	***An. vagus***		⊙	⊙				
12	***An. varuna***			⊙				
13	***An. nigerrimus***			⊙				
14	***An. pseudojamesi***			⊙			⊙	
15	***An. peditaeniatus***			⊙				
16	***An. sinensis***			⊙				
17	***An. aconitus***			⊙				
18	***An. philippinensis***			⊙				
19	***An. karwari****							
20	***An. gigas****							

* Adults were not collected from any of the collections

Susceptibility status of vectors to insecticides

There was an indication of resistance by *An. culicifacies* to DDT with only 5% mortality after one hour exposure (n=40) to

the diagnostic dose of DDT and 30% mortality after 24 hours holding period. However, the species was found susceptible to malathion as the mortality was 100% after 1 hr exposure and 24 hours of holding period. Tests with more samples need to be conducted to confirm these results. Susceptibility status of *An. fluviatilis* and *An. annularis* could not be determined during this short visit as the adult samples collected were too low.

At present, in Korba district DDT is being used for indoor residual spray operation with reported room coverage of 84% to 92% between 1997 and 2001. It is likely that the DDT residual spray may not produce the desired results as *An. culicifacies*, one of the important vectors, has shown development of resistance to this insecticide. However, the impact will depend on the relative importance of *An. culicifacies* in malaria transmission.

Incidence of malaria (fever survey)

In the active surveillance conducted in six villages (belonging to Korba, Pondiuproda and Khatghora Blocks) having a population of 3650, 19 blood smears were collected from people complaining fever and seven (SPR=36.8) were found positive for *P. falciparum*.

KAP

A total of 35 persons of both male and female occupying different socio-economic status were interviewed focusing on six major issues regarding malaria and its control. People's response to each question was categorized in to three levels (Table 6).

Among the total persons interviewed, 51.4% could relate malaria to mosquito bites, 17.1% knew only symptoms of malaria fever and could not relate the fever to mosquitoes and 31.4% expressed that they did not have any idea. Malaria was considered as a major health problem by 85.7% of the persons and 2.9% felt that it was not a problem.

Free availability of chloroquine in the villages was endorsed by 77.1% of the people, 17% expressed that it was available on demand and 5.7% told that chloroquine was not available. Regarding treatment seeking behaviour, 100% dependency on governmental agencies was realized. None had reported of the

behaviour of seeking either from private agencies or traditional healers.

Majority (88.6%) use traditional smoking as mosquito repellent or personal protection measure and 8.6% use bed-nets. Almost equal proportion of the people certified that the spray was regular (45.7%) or irregular (42.9%).

Table 6. Information on KAP regarding malaria in villages of Korba district

Particulars	*Categories (n=35) in %		
	I	II	III
1. Knowledge on malaria	51.4	17.1	31.4
2. Current malaria problem	85.7	11.4	2.9
3. Availability of chloroquine	77.1	17.1	5.7
4. Treatment seeking	100	0	0
5. Personal protection	8.6	88.6	2.9
6. Spray and acceptance	45.7	42.9	11.4

*Categories (n=35)

		I	II	III
1.	Knowledge on malaria	Relate malaria to mosquito	Aware of only malaria symptom	No idea
2.	Current malaria problem	Severe	Moderate/low	No problem
3.	Availability of chloroquine	Freely	On demand	Not Available
4.	Treatment seeking	Govt. agencies	Private	Traditional
5.	Personal protection	Bed net	Traditional smoking	Not using
6.	Spray and acceptance	Regularly	Irregularly	No spray /not known

Findings

PHC/District data

Stratification of Blocks based on the mean API recorded in the Sections of the respective Blocks during the past three years (1999 – 2001) shows that Pondiuproda recorded the highest median value (Table 7) suggesting that a greater number of Sections under this Block are highly endemic to malaria. Though, Katghora and Korba recorded the maximum API value, majority of the Sections are low endemic compared to others.

Table 7. Range and median API values recorded in different Blocks of Korba district during the years from 1999- 2001 and percentage of *P. falciparum* cases.

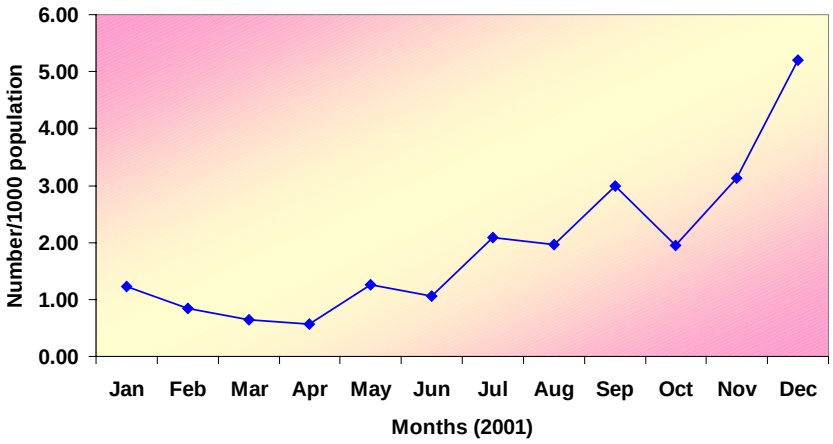
Blocks	*Annual Parasite Incidence (API) in sections*			*% Pf*
	Minimum	*Maximum*	*Median*	
Pondiuproda	3.2	257.0	19.4	78.9
Kartala	2.1	26.3	8.0	66.6
Pali	0.6	128.4	5.8	91.5
Katghora	0	378.1	4.1	35.9
Korba	0	203.0	3.0	27.3

The proportion of *P. falciparum* cases is lower in the latter two Blocks (Table 7). From all respects, the first three Blocks are important in terms of malaria problem and need more attention for intervention.

Seasonality:

Overall, malaria incidence occurs in all months. The monthly parasite incidence (MPI) is relatively low during February – April, starts increasing from May, higher during the rainy months, July – August and peaks during November – December, the post-monsoon period (Fig.2).

Fig.2. Monthly parasite incidence recorded in Korba district during the year 2001.



ne possible explanation is that *An. culicifacies* may be responsible for the increasing transmission during the summer months i.e. May – June. During rainy and cooler months, *An. fluviatilis* could be the vector responsible for transmission.

Recommendations

- Of the recorded *Anopheles* species during the survey, there are three known vectors viz., *An. culicifacies*, *An. annularis* and *An. fluviatilis*. *An. culicifacies* and *An. fluviatilis* have been incriminated as vectors in the adjacent geographical region. The relative importance of these two species in malaria transmission in the district has to be assessed for effective targeting.

- There was an indication of resistance development in *An. culicifacies* to DDT and therefore, the continued use of DDT residual spraying needs to be reviewed.

- Information on the susceptibility status of *An. fluviatilis* needs to be generated.

- The major larval habitats in the district are of two types, one is man-made or confined and the other one is natural. The man made or confined habitats are burrow

pits, ponds (Plate 5a) and wells (Plate 5b) where use of larvivorous fishes involving community will control the vector breeding. In ponds composite fish culture can be promoted as an income- generating scheme apart from mosquito control. The burrow pits have to be filled up. Canalization of seepage water in to a confined place and release of fishes will prevent breeding in seepage pools (Plate 5c).

- ❖ Among the natural larval habitats, in irrigation canals (Plate 4a) vector breeding could be controlled to an extent with involvement of the community by deweeding and trimming the edges.

- ❖ In the other natural *Anopheles* larval habitats, anti-larval operation may not be feasible or cost-effective proposition.

- ❖ For better planning / implementation of anti-larval measures, the relative importance of these larval habitats has to be determined.

- ❖ Drug availability is satisfactory in all villages. However, diagnostic facilities are inadequate. Therefore, the peripheral facilities for slide examination, reporting and treatment should be strengthened.

- ❖ The KAP study indicated that majority (88.6%) of the villagers interviewed use traditional smoking as mosquito repellent or personal protection measure and 8.6% use bed-nets. In this context, personal protection measures including insecticide treated mosquito nets may be promoted.

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VECTOR BEHAVIOUR AND ITS IMPLICATION ON CONTROL

Transmission dynamics of malaria has three basic components viz., the parasite, the vector and the host. Interruption of transmission is possible by attacking either the parasite or the vector or combination of both or reducing man vector contact to break the crucial interaction. Among these options, vector control aims to interfere either with birth or death of the mosquitoes thereby reducing the population to a level at which transmission is not possible. While vector control aims at prevention (reduces the gain of infection) parasite control is mainly curative (increases the loss of infection, also reduces the gain of infection).

In addition, vector control has some advantages: it,

- ❖ interrupts the transmission
- ❖ has long-term benefits from environmental control measures
- ❖ gives relief to people's sufferings
- ❖ increases the community acceptance
- ❖ sustains disease control when combines with parasite control
- ❖ is cost-effective if carried out in right place and right time
- ❖ helps environmental improvement
- ❖ controls other parasitic and infectious diseases

The following are the different vector control options

- ❖ Chemical – larvicides and adulticides
  - o Indoor residual spraying, space spraying
- ❖ Biological – larval control
  - o Biolarvicides, IGRs, fishes, predators and parasites and genetic manipulation
- ❖ Environmental
  - o management: manipulation, modification
- ❖ Physical methods – covering, polystyrene beads

The degree of anopheline presence and contact with man in a given situation, vector reproduction and life cycle form an

integral part of malaria epidemiology. They constitute the broad background against which malaria transmission takes place and provide some of the elements necessary for the design of integrated malaria control operation at the local level (Molineaux et al. 1988).

Further, selection of vector control options and for the modalities of their application in a given situation are mainly based on the vector population characteristics especially behavioural components in life cycle.

Behaviour is defined as what animals do. Precisely, it is the ways in which an organism adjusts to and interacts with its environment and it includes both maintenance and communicatory activities. The term covers a very wide range of activities and it helps to recognize some sub-categories (Matthews and Matthews, 1978) or sub-populations such as indoor resting, outdoor resting, endophagic, exophagic, anthropophagic, zoopahgic etc.

The effect of different control measures on the transmission of vector borne diseases is based on the fact that at every feeding cycle the vector feeds, rests and oviposits. Thus vector control measures have multiple chances to impact the vectors transmission potential. For example, indoor residual spraying has a chance of killing the vector after every blood meal i.e. four to five times before it can transmit *P. falciparum* assuming a sporogonic cycle of about 8-10 days.

Personal protection methods or the diversion of bites from man to animal can interfere twice with transmission, first by reducing transmission from human to vector and second by reducing transmission from vector to human. Other control methods, such as space spraying or repellents usually have only a limited impact on the vector due to their limited residual time. The relevance of behavioural stages in the life cycle of a vector mosquito and vector control options are depicted in the Fig. 1.

Breeding characteristics have obvious relevance for larval control. The time required for development of aquatic stages is an important characteristic determined in part genetically (it may differ between species) but greatly affected by temperature. It is pertinent for setting the frequency of larvicide application or the pattern of intermittent irrigation.

Other important factors are the relative contribution of different types of breeding places and their spatial distribution, in terms of distance from human settlement, accessibility and amenability to various methods of larval control.

Use of insecticides largely depends on resting behaviour of the vector. The important characteristics are the degree of endophily/exophily, the regularity of individual behaviour in this respect and the precise identification of resting places both indoors and outdoors. With respect to indoor resting it is useful to know the distribution between human and animal shelters, the amount of exchange between the two and also the distribution of resting mosquitoes in the shelter, for example in relation to height on the wall (Molineaux et al. 1988).

A recent study in Orissa (India) showed that *An. fluviatilis*, the major malaria vector, preferred to rest on walls in human dwellings during day as well as night. On the walls, more than 50% were collected at a height above 3 feet and this habit would enhance the impact of the spray. However, a considerable (27.7%) proportion was found resting on unsprayable surfaces and this population might escape from the effect of spray (Gunasekaran et al 1995).

The relevant characteristics of feeding behaviour are the degrees of anthropophily/ zoophily and of endophagy/exophagy of the vector population, the regularity of the individual vectors' behaviour in this respect and the feeding cycle (biting rate by hour of the night). The time of feeding is very important, both for vector efficiency and for the effectiveness of control. The most efficient vectors tend to bite mainly in the middle hours of the night, when people are in deep sleep, while vectors biting at dusk or dawn are more likely to be an obvious nuisance, thereby causing people to defend themselves more effectively against them. Bednets and indoor spraying will be more effective against vectors of the first type if people sleep indoors (Najera and Zaim, 2002).

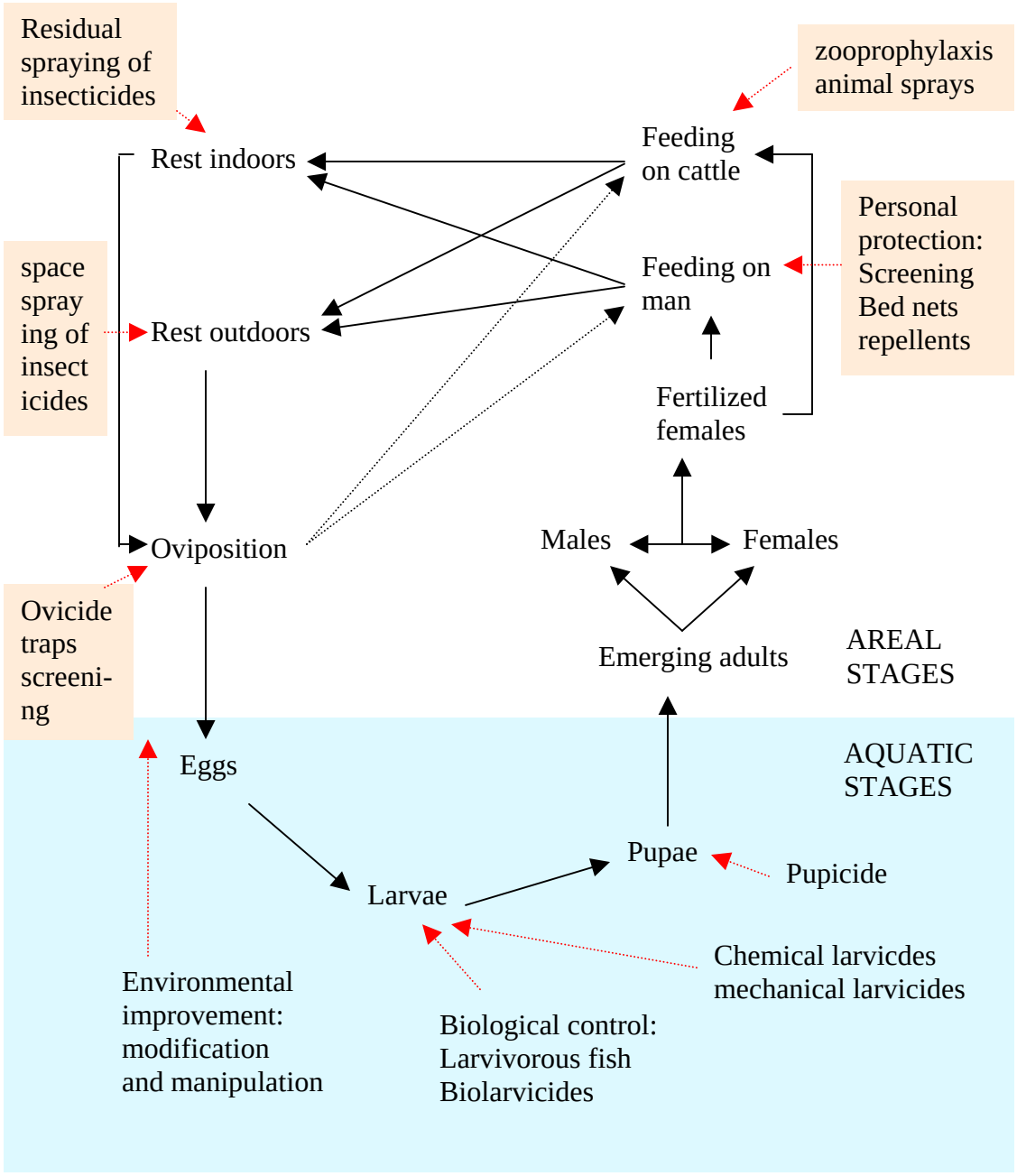
Case studies

1. Jeypore zone in Koraput district of Orissa state has been highly endemic for malaria. Indoor residual spray using DDT was being carried out as a vector control measure. But, the major malaria vector, *An. fluviatilis*, was predominantly exophilic. In this situation, behavioural study clarified

that though the vector in majority was outdoor resting, its nocturnal resting behaviour facilitate its contact with sprayed surfaces as the hungry females rest before they feed and also the female mosquitoes did not leave the house immediately after the blood meal, but rested for some time (Gunasekaran et al., 1994).

2. Study by Dash, A.P. in Keonjar district of Orissa. The study observed that in areas where spraying was done only in cattle sheds leaving human dwellings incidence of malaria was very high. This was due to the fact that the vector was forced to rest in human dwellings avoiding the sprayed cattle sheds. As a result, frequency of feeding of mosquitoes on man was enhanced and ultimately there was an increase in incidence of malaria. Based on the observation, it was decided that cattle sheds should not be sprayed unless human dwellings are sprayed.

Fig. 1. Behavioural stages in the life cycle of a vector mosquito and vector control options



References

Gunasekaran, K., Jambulingam, P. and Das, P.K. (1995). Distribution of indoor-resting *Anopheles fluviatilis* in hunman dwellings and its implication on indoor residual spray. Indian J. malariol. 32, 42-46.

Gunasekaran, K., Sadanandane, C., Parida, S.K., Sahu, S.S., Patra, K.P. and Jambulingam, P. (1994). Observations on nocturnal activity and man biting habits of malaria vectors, *Anopheles fluviatilis*, *An. annularis* and *An. culicifacies* in the hill tracts of Koraput district, Orissa, India. *Southeast Asian J Trop Med Public Health*, 25, 187-195.

Molineaux, L., Muir, D.A., Spencer, H.C. and Wernsdorfer (1988). The epidemiology of malaria and its measurement: Malaria-Principles and practice of malariology, v. 2. Churchill Livingstone. P 999-1089.

Mathews, R.W. and Mathews, J.R. (1978). Insect behaviuor. University of Georgia. A wiley-interscience publication, John Wiley & sons, New York. Pp 507.

Najera, J. A. and Zaim, M. (2002). Malaria vector control: Decision making criteria and procedure for judicious use of insecticides. WHO/CDS/WHOPES/2002.5. pp 106.

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COMMUNITY BASING OF MALARIA CONTROL

- THE MITANIN PROGRAMME- Building on the past .

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Introduction:

Community participation in malaria control is not a new concept. It has been around almost since the inception of malaria control operations.

Before the advent of DDT, in pre-independence days environmental control measures to reduce mosquito breeding were the major focus of control operations and and even the colonial state recognised the necessity to involve the population in environmental vector control. With the advent of DDT for a decade, it seemed possible by administrative measures alone driving intensive spraying operations the problem could be tackled. But by the mid seventies this promise faded away and community participation again gained emphasis.

Community participation took many forms.

Village mobilisation for Shramdan (collective voluntary labour).

One continuing form of community participation, has been mobilisation of the village for source reduction and bio environmental control. This was tried extensively in the eighties with large scale pilot models initiated by Malaria research center or b some state governments. The main activity for the community would be shramdan for filling up burrow pits, making soakaways, cleaning irrigation channels and so on.

Community rearing of fishes combining fishes of commercial value with those who are useful for clearing larvae was also carried out.(ref. Community Participation in Malaria Control, ed. VP Sharma,published by Malaria Research Center, 1993.)

In most of these programmes there was some village committee structure, but emphasis was not on creating local institutional or organisational structures as it was for health education inputs and shramdan. The only institutional structure that has been used widely has been

the school system, where enthusiastic participation by children has always been reported. Involvement of the community has also almost always been in programme implementation, seldom in planning as the latter was seen as almost redundant. Use of NGOs has been limited and that too largely with local NGOs, and for short periods of time

The problem has been both of replicating this at a large scale and of sustaining this where it has been tried. Social mobilisation is possible in a limited area where a team- from NGO or from government -focuses on this task. But when expanded into a state programme to develop the same degree of facilitation across the state has not been possible. Unless there is investment made in such social mobilisation as is needed for replicating shramdan type interventions, this does not happen just in response to an appeal. And to sustain the mobilisation that has happened needs carefully planned and well negotiated local institutional structures. Too often the system complains about the lack of initiative and action by the community ,not realising that in the absence of locating it in an institutional framework, such mobilisation is difficult to initiate and impossible to sustain.

Outreach approaches

Another major dimension of community involvement has been through outreach programmes for providing easy access to chloroquine and often to collect blood smears for examination and ensure timely referrals.

Starting from the Community health worker programme of 1978 , there has been in sequence a long list of schemes- the community health worker, the village health guide, the link worker, the malaria link workers, the jan swasthya rakshaks and the use of traditional healers for this purpose. One feature has been always to declare the programme a failure and soon after a couple of years enter into the scheme of a similar type. The system has always had to contend with the need for such aprogramme vis a vis its own track record of being able to build such a programme.
Thus for example in the state of Chhattisgarh the need is for 54,000 outreach workers for the estimated 54,000 hamlets. But currently even to reach to the 20379 villages is a problem as there are only 3818 sub-centers the furthest outreach point of the existing health system.

It is perceived that adequate honorarium would make the programmes successful- but the evidence on the contrary points to very low honorariums seldom providing adequate motivation. And adequate honorariums are neither affordable nor possible to operationalise within the existing system.

Mitanin programme approach.

The Mitanin programme builds upon past experiences.

Some of the main points of difference between the design of this programme and the other outreach approaches are listed below:

EARLIER APPROACH	ONGOING MITANIN PROGRAMME'S APPROACH.
Usually Male workers	Female worker.- greater sensitisation to health issues, better outreach to women and children ,less motivation to set up as quacks.
Selection by health staff or by panchayat	Selection is process intensive. It is by the population of the hamlet, approved by the panchayat. It involves a trained and sensitised facilitator, interacting with the village to provide adequate information to them, ensure weaker sections are involved and that due processes are followed. It involves social mobilisation at this stage itself.
Often at village level or even panchayat level.	Insistence of a separate woman-Mitanin- in every hamlet. This in itself would ensure a wider participation of weaker sections and allow outreach to the most underserved areas.
Curative centred – preventive aspects present but no specific plans and this does not happen. Often set up and encouraged to set up as quacks	Planned preventive and promotive interventions. Curative care present but as supplementary, not central to process. Drugs provided by the state with a strong referral arrangement.

Honorarium drives and ensures participation in training or work.	No honorariums. Seen as representative of community, ensuring their rights and monitoring the system on their behalf rather than as lowest paid government employee. Also safeguards selection process from pressures.
Training –a one time long duration activity. No specific plans for deployment.	Training programme is staggered over 12 months. Twenty days of camp based and 30 days of field based training. After each 2 to 4 day round of training there is a planned and supported deployment of one intervention.
Almost no plans for support- except some compensation.	The plan envisages active support for at least three years. At least two days of contact classes per month. And a force of facilitator – trainer to provide this support. Understanding that programme can be sustained only as long as such a support is sustained.
Small NGO led models successful and sustainable as long as funds are available. Large Government directed models do poorly.	Systematic government – civil society partnership at all levels. In the state with the State advisory committee and the State Health Resource Center. At districts and local levels by coordination committees and actual resource facilitated involvement of local NGOs and community-based organisations in different roles.
Often seen as parallel or even as a substitute for a public health system.	Seen as ensuring peoples right to health services- as a means of not only supplementing but of strengthening the public health system.

Today the Mitanin programme has reached out to 80 blocks out of the 146 in the state. Most blocks are in the selection phase and by May would move to the training phase. The experience with the pilot blocks meets expectations of the programme.

Community Basing the Programme:

The other major learning that is being incorporated into this programme from past lessons is the need for community

involvement from the planning stage –not only for implementation.
The planning process is also seen as a learning process for both the health system and the village folk – not only for the latter.
The planning process is also seen as a capability building process in both panchayats and mitanins.

The programme on malaria control therefore envisages a local level planning for malaria control as its entry point. The plan has to incorporate the outreach to all services provided by the state, and plan for local collective voluntary actions together as well as improve individuals access to personal prophylactics. Particular emphasis is placed on being able to bring down BSE reporting time to 24 hours with some of the facilitation for this being volunteered by the village.

Local institution building and Social Mobilisation:

To replicate such a planning and implementation process in all the villages requires a number of inputs. The central input- the trained Mitanin- is now available in every hamlet. In the third or fourth month of her programme she is involved in this task.

The other major input is a trained facilitator who would reach out to the village and especially the panchayat for training them and handholding support to them through this programme. In the absence of about one facilitator one would not be able to make such voluntarism happen in every panchayat.

Yet another input is now the existence of the women's health committee in every hamlet and the revitalisation of the panchayat health committee.

The panchayat health committee and the elected panchayat itself is taken through this process and gets sensitised and more capable as result. The proposal is to also make a fund available for the panchayat plan–part of which is un-tied- to be left to the discretion of the panchayat for expenditure on perceived priorities- and part of it is tied to specific objectives of anti malaria operations.

Finally it is recognised that planning process needs to be accompanied by active social mobilisation processes- meetings, kalajathas, local events etc which not only build up the public understanding of the issues involved but also

secure their will to participate in such a programme. Special attention is given during social mobilisation to ensure that weaker sections use these processes to negotiate a better position in decision making bodies and in whatever local organisational and institutional structures come up.

Access to Expertise.

Another important dimension of local planning and participation is access to scientific and technological expertise.

Many problems need technical inputs that must be provided to it from outside. Thus it would be unrealistic to expect each panchayat to learn to study its entomological situation. But certainly they need to know the main vector and its main biting and breeding behaviour for that panchayat. A data-base on this with dis-aggregation to every block would be a minimum requirement for this.

Many problems need technical inputs which can be learnt by it but it would be inefficient to try to load all person in all panchayats with all inputs merely because a few of them may need it. However to those few it would be critical.

For example extensive burrow-pits in an area would need to be linked with each other and sloped so that they drain into a reservoir where the water is kept larva free– rather than filled! And for each of over 50 potential sources there are many possible alternatives. But it makes little sense to bring all this information into to mass communication material. However when the panchayat plans such expertise should be available to it locally and it seldom is.

Many problems need technical inputs so that the same job can be done with greater efficiency and less effort and resources. Thus a village may have over a hundred breeding sites. However in a given season not all potential sites are actual breeding sites. Identifying mosquito larva is simple enough and a charting of breeding sites would reduce interventions to manageable quantity. Thus in one pilot village there was over fifty ponds and wells and two major irrigation channels that had to be planned for but none of them were actually breeding sites then. An effort on them would have been wasteful if not impossible. Breeding was

located only in two sites for that village – an irrigation tank and one seepage point. A lot of such optimisation of effort can go on if villages have access to expertise, which can help plan locally.

Another area where expertise is needed is to measure programme outcomes and help communities look at the effectiveness of different options and interventions.

Availability of such expertise to help the planning process is limited. Inviting academicians or institution-based researchers would be needed but would hardly solve the problem. For there would not be enough such persons available to service every district, even if they could relate to filed level operational issues, which often they cannot. Training programme for facilitators would help but what is really needed is district level resource groups that can help in all health planning. And this would emerge only if at some level operational research synergised with programme evaluation is made apart of district health administration and this is linked to local planning and the community participation process.

The Challenge of local Planning.

Whenever local planning has been mandated, the experience has been that the plans that emerge tend to be mechanical and stereotyped and do not incorporate local variability adequately. This is an easy and a lazy comment for city based sponsors to make. Only those who have been through such a process and possess sufficient technical foundation of their own would recognise that often the degree of knowledge and skills needed for local planning are no less than for state-level planning. To come up with different plans for each different panchayat and hamlet requires good local data, clear analysis, an ability to go beyond immediate perceptions of people and get them into thinking about alternative ways of doing things and finally the ability to collate and present in a report form and budget for the same is a challenge which is often underestimated.

Too often a call for local planning is not followed up with resources, the processes and the capability building that is required to make it happened. In the absence of such inputs calls to local planning become abdication of responsibilities at higher levels. In the presence of adequate resources and support , along with institutional

mechanisms at the local level, the goal of community participation would be realised. However difficult this may be, this goal is well worth the effort.
For such local planning is not just a useful method. In every democratic society ,it is a goal in itself.

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