TRAINING MODULE FOR MEDICAL OFFICERS OF PRIMARY HEALTH CENTRES

PART - 2
TUTOR'S GUIDE

DIRECTORATE OF NATIONAL MALARIA ERADICATION PROGRAMME
DIRECTORATE GENERAL OF HEALTH SERVICES
MINISTRY OF HEALTH AND FAMILY WELFARE
GOVERNMENT OF INDIA
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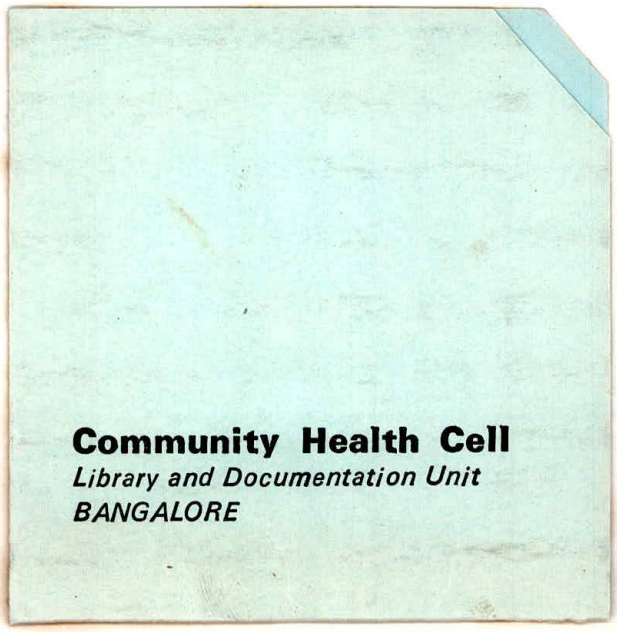

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INTRODUCTION

Prior to implementation of malaria control measures (1953) and later malaria eradication programme (1958) in India, Malaria was the major public health problem and affected all spheres of human life. **In 1933 Sinton, one of the eminent Malariologists said "the Problem of existence in very many parts of India is the problem of malaria".**

In the past, a lot of research work was carried out on various aspects of malaria in India and the malariologists of this country were among the pioneers in this field.

The eradication strategy laid down that the entire country would enter maintenance phase by 1966-67 and the responsibility of maintaining malaria free status would be taken over by the General Health Services.

Under the concept of Rural Health Care, the health infrastructure was developed around Primary Health Centres. The staff requirement and other logistic support have undergone many changes in the light of recommendations of Chadha Committee, 1963 and Kartar Singh Committee, 1973.

The resurgence of malaria in the country in late sixties was due to various technical, administrative, organisational and logistic problems. It was apparent that malaria eradication was not a feasible proposition and the objective was changed to malaria control. The Primary Health Centre was made the nodal point for malaria case detection and treatment activities. For administrative and technical supervision at the district level, the District Malaria Officer was made in-charge of malaria control.

It is well known that the distribution, intensity and prevalence of different parasite species in the community determine the malaria control strategy in the area. The case detection is the direct responsibility of PHC Medical Officer and he is the focal point of such activities. As the efficiency of case detection determines the control strategy, the PHC Medical Officer has a very great responsibility on his shoulders in the revised strategy of decentralised planning of malaria control. He plans and supervises the activities of MPW (M) and MPW (F), Health Supervisor (Male & Female) and FTD, DDC, etc. On his reports monitoring and assessment on malaria situation in his area, the intervention measures are planned and executed. He is also responsible for treatment and management of serious cases of malaria with *P.falciparum* infection. His responsibility as a Clinician lies on early diagnosis and prompt treatment of such cases at the PHC. In case proper facilities are not available, he should send the cases to referral hospitals to prevent mortality due to malaria.

It is, therefore, necessary that PHC Medical Officer should be trained properly on various aspects of malaria control.

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PREREQUISITES FOR TRAINING

1.1. ORGANISING TRAINING PROGRAMME ON MALARIA

The State Health Authorities will have to take the following steps for organising the training programme. The guidelines given hereunder are only suggestive and the organisers of the training course could add other details wherever needed. The suggestions for further improvement of the tutor's and learner's guides are most welcome which will be incorporated in the reprint.

i). Resources:

The resources for the training should be earmarked and the funds must be made available for the training well in advance by the State Programme Officer. The State Health Authorities shall prepare the number of training courses to be conducted, fix venues and tentative dates, earmark the budget well in advance for smooth running of the training programme in the ensuing financial year.

ii). Venue of Training & Course Director:

The venue of each training course and the Course Director must be identified by the State Programme Officer. While selecting venue of the training, the State Malariologist should keep in mind that the training institution must have all the infrastructure facilities listed at Sr. No. 4. The Regional Family Welfare Training Centre or any other reputed training centre with all the required facilities very near to the participants' working place as well as field practice centre should serve the purpose. The dates of training should be intimated to the training institution to reserve the slot for the five days training.

The Course Director shall be a senior Health Official such as Regional Director/Zonal Officer/ Principal of R F W T C/Deputy Director (M)/ Chief Medical & Health Officer. The Course Director should possess expertise in malariology and must have undergone training in Malariology or Malaria Entomology conducted by the Directorate of NMEP/NICD/MRC/IVCZ (Hosur-TN) or any other reputed organisation.

iii). Training Period:

The training is for five days preferably from Monday to Friday without any intervening public holidays. The training during peak malaria transmission period shall be avoided so that the Medical Officer's presence is ensured in the PHC to supervise the control measures and man the referral centre for the management of severe and complicated malaria.

iv). Number of Participants:

Each training course shall have 25 participants. The participants should be informed at least one month before the commencement of training. The participants have to confirm in writing to the Course Director about the time, date and mode of travel to the venue as well as requirement of accommodation to the concerned Officer of the training.

v). Course Co-ordinators:

The Course Director should identify senior officers for sharing the responsibility of different

aspects of training such as accommodation, audio-visual & other class room facilities, field visit, etc. There shall be one or two course Co-ordinators who will be assisting the Course Director in the overall coordination of different disciplines and activities.

vi). Transport:

One big bus shall be hired for 40 persons so that all the participants, faculty and resource persons can travel together for the field exercises which will save time and facilitate interaction between participants and faculty as against transporting them in small batches.

1.2. Calendar of Activities

The Course Director in consultation with the Course Co-ordinators and other officers involved in the training shall prepare calendar of activities, at least three months ahead of the training. A check list for each aspect shall be prepared.

First Four Weeks (i.e. 12th to 9th week before the commencement of training):

The State Health Directorate shall be informed of the confirmed dates of training and issue circular to all the DMHOs of the Region to sponsor specified number of Medical Officers of the highly problematic PHCs on priority and to intimate the names of participants to the Directorate of Health Services with a copy endorsed to the Course Director. The Director of Health Services should allocate the funds with instructions on how to spend the money under each head. In case the training course is conducted through WHO assistance, the general circular for spending money under different heads must be communicated to the Course Director. The participants shall submit in writing about their participation in the said training to ensure full attendance.

Fifth to Eight Week: (i.e. 8th to 5th week before the commencement of training):

i). The letter for accommodation shall be addressed to the concerned Departments by the Course Director.

ii). Transporter for 40 seated bus shall be identified.

iii). Contractor for catering shall be contacted for tea & snacks and working lunch.

iv). The faculty for different lectures and field exercises shall be identified and get their confirmation letters. The faculty shall be provided literature concerning the topic. The faculty shall also be informed that the facilities for overhead and slide projectors, Flip charts, writing board, etc. are available with the training institution.

v). The Officer in-charge of the field visit shall visit the PHC to make arrangements for the field exercises.

Ninth to Tenth Week: (i.e. 4th to 3rd week before the commencement of training):

i). The Chief Guest and other speakers shall be identified and informed of the inaugural programme.

ii). Preserved material for conducting the inaugural exhibition shall be procured and kept with the officer-in-charge for this activity.

iii). Invitation cards, if desired, for the inaugural session shall be got printed.

iv). Certificates, if desired to be distributed, shall be got printed.

Eleventh Week (i.e. 14 days to 8 days before commencement of training):

i). The banner for the training course shall be made ready.

ii). Stationery items shall be procured.

iii). Photostat copies of the lecture notes shall be completed.

iv). Sets for distribution to the participants shall be made ready.

v). Invitation cards, if got printed, shall be posted.

Final Week: (i.e. 7th day to the day of commencement of training):

i). The Course Director shall re-confirm all the preparations for the different activities and ensure smooth inauguration of the training on the following Monday.

ii). It should be ensured that the audio-visual equipment is in good working order. He should ensure that the concerned officers and staff meet on Saturday and Sunday preceding the actual training for completion of all preparations.

iii). On Sunday the live specimens for Exhibition shall be collected and the exhibition material shall be kept ready for display on Monday morning.

1.3. Selection of Faculty

As already indicated the identified faculty for the particular topic shall be informed well in advance to allow sufficient time for preparation of lecture notes, transparencies and slides.

The faculty for the topic shall be proficient in the art of pedagogy who should allow sufficient time for interaction with the participants. It is preferable to select a Chairman for morning and afternoon sessions for moderating the topic and time keeping.

The faculty could be selected from the State Health Directorate, ROH&FW, RFWTC, Medical Colleges, Dte. of NMEP, Zonal Office, DMHOs, etc.

1.4. Requirement of Training Facilities in the Training Institute

The following material is the minimum need for the training component.

1.4.1. Audio-visual equipments like (a) slide projector (b) over head projector (c) micro-phone system (d) television (e) VCP (f) cassettes on bio-environmental methods, impregnated bednets and others which are relevant (g) white writing board/coloured pen set for the board (h) duster (i) spare blank transparencies and pen set for transparencies, photography for inaugural/ concluding sessions.

1.4.2. A good lecture hall with writing pad chair or ordinary chairs with seminar tables with good ventilation but with least sound disturbance.

1.4.3. Facilities for typing and photostat arrangements

1.4.4. Demonstration material for pictorial exhibition of different malariogenic situations in the State, live demonstration of vectors and aquatic stages, microscopic demonstration of parasites, different methods of personal prophylaxis, bio-environmental and chemical control methods, spray equipments, charts, maps depicting malaria related aspects, etc.

1.4.5. Lecture notes, review papers and other teaching material, writing material, file covers, etc.

1.4.6. Facilities for serving snacks, tea and lunch.

1.4.7. Adequate transportation & accommodation facilities.

1.5. Principles of Training

The following major principles are to be followed while conducting the training:-

i). The training period should be judiciously balanced between class room lecture-discussion, practical demonstration in Laboratory/field and work performance in the field pertaining to the programme needs in the existing field conditions.

ii). The learning objectives and the skills to be developed as given in Learner's Guide should be kept at the back of mind while conducting the training.

iii). The lecture component should always incorporate sufficient time for discussion and the moderator should ensure full participation of the learners so as to increase the learning urge and full attention to the topic.

iv). The pre-test proforma (Appendix-1) will give sufficient insight to the tutors about the lacunae in the knowledge of the learners and enable them for constant guidance & individual attention to the participants. Encouraging compliments for improvement in the learner's work would strengthen the learning skills of the participants.

v). While discussing Drug Resistance (Unit 7) current drug resistance status in the State and Map showing resistant areas will be emphasised/ displayed.

vi). While teaching Malaria Vectors (Unit 3) emphasis will be on the bionomics of the local vectors.

1.6. Material to be, distributed to the Participants at the Time of Registration

The following material shall be distributed to the participants at the time of registration.

i). File Cover/Folder for keeping day to day learning material.

ii). Writing Material; Note pad (bigger size), ball point pen, lead pencil, eraser and pencil sharpener.

iii). Training Modules - Learner's Guide.

iv). Training Modules (Tutor's Guide) for DDC/FTD Holders, Voluntary Link Workers and MPWs.

v). Laminated folder on Malaria Parasite.

vi). Space for registration of participants which shall be completed before the inaugural session in an ante-room.

1.7. Arrangements for Inaugural Session

The following arrangements shall be made for the inaugural session.

i). Seating arrangements on the dais with name plates.

ii). Banner on the training behind the dais.

iii). Seating arrangements for participants and special invitees.

iv). Working condition of audio-visual equipment to be rechecked before the actual function.

v). Standby generator shall be kept ready for meeting the exigency of power failure.

vi). Copies of key note address, if desired.

vii). Bouquets for the Chief Guest and VIPs, if desired.

viii). Photography arrangements, if desired.

ix). Inaugural Tea & Snacks.

1.8. Material for Exhibition during Inaugural Session

The following display material shall be exhibited outside the lecture hall but in the vicinity of place for inaugural tea.

i). Microscopic demonstration with labelling of different stages of various species of malaria parasite like ring, trophozoite, schizont of *P.v.* and ring, gametocytes of *P.f.*, etc.

This will be done daily for the first three days with 5 compound microscopes.

ii). Aquatic stages of live specimens of *Anopheles, Culex* and *Aedes* in petri dishes and adult male & female specimens of these genera in test tubes.

iii). Display of pinned malaria vectors in the region focussed under simple microscope.

iv). Spray equipment and other control measures - bio-environmental and chemical.

v). Efficacy of larvicides (Enamel tray showing the dead larvae after larvicidal treatment).

vi). Personal prophylactic measures - Models on the use of impregnated bednets, mosquito proofing of house, etc.

vii). Charts on life cycle of malaria parasite, life history of *Anopheles* and *Culex*.

viii). Posters on environmental sanitation and other IEC material.

ix). Tables and Graphs depicting epidemiological data and malaria incidence in different years and monthly trend in the Region and State and highlighting problem districts and PHCs. Charts, maps and photographs depicting epidemiology and control aspects of malaria. Pictorial exhibition of different malariogenic situations in the State. Table on DDCs and FTDs established and functioning.

1.9. Pre-test

Pre-test model paper is given at Appendix-1. The tutor may not repeat the same questions for every training batch. The pre-test papers should be evaluated immediately by the Faculty within half an hour when the participants will be engaged in lecture discussion. The participants should be informed about the errors committed by them in the pre-test paper.

1.10. Field Visit - Briefing and Other Details

The participants shall be informed about the exact time to assemble for field trip and the exercises to be conducted there. The participants are to be divided into five groups, selecting a group leader for each group. The tasks to be conducted are to be given in detail with the proformae for each task and the area (village or part of a village) earmarked to each group should be specified. Resource person for each group should be identified who should accompany and guide the group in the field exercises.

The Training Officer in charge of field visit will drop each group at the specific point and give them time and place of collecting them back for the return trip. The resource person will take the group round the village as per predetermined route so that the time is spent judiciously to extract maximum work.

Each participant of the group shall be exposed in turns about blood smear collection, filing up the proforma, interview with the community leaders, householders, private practitioners, Voluntary Link Workers, etc. Similar method will be followed for IEC which shall be conducted side by side with active and passive case detection components. Each participant may conduct KAP study on the proforma (Appendix-2) at least from three randomly selected households. The participants should interact with the students and teachers of the school on IEC.

The afternoon session could be conducted at PHC headquarters. All the participants could be divided into two batches; one batch for demonstration of indoor residual spray while the second batch for Laboratory demonstration & evaluation of anti-malaria activities. During visit to the Laboratory, the participants will also see the maintenance of records, proformae, charts and maps. They will also be shown stain preparation, staining and examination of blood smears. After completing the first assignment, the batches will attend to the second assignment.

The participants will supervise the preparation of suspension, measure the discharge rate of

nozzle tip, learn the spray techniques and calculate dose of active ingredient per sq. metre.

At the conclusion all the participants, faculty and resource persons will have group discussion and summing up the field exercises.

1.11. Epidemiological and Skill Learning Exercises

The exercises are given at Appendix - 3. These are to be distributed to the participants in the class room and they have to individually solve the exercises within 60 minutes. The exercises, preferably be given to the participants on the third day of the training for home work.

The tutor shall take the exercise one after the other systematically on the final day. Doubts of participants will be cleared by the tutor. The solved epidemiological exercises will be kept with the participants for future reference.

1.12. Post-test

Post-test model paper is given at Appendix - 4. The tutor may not repeat the same questions for every batch of trainees. The comparison of Pre-test and Post-test papers will help the tutors to evaluate the training and enable them to improve the training for subsequent batches. The Pre-test and Post-test answer papers are to be retained by the Course Director.

1.13. Evaluation of Training by the Participants

The proforma for evaluation of training is given at Appendix - 5. The critical comments could be anonymous and the faculty shall take these comments into consideration for improving the training programme wherever needed, for subsequent batches.

1.14. Concluding Session

The Chief Guest for the occasion shall be contacted on the preceding day and ensure his presence sharp in time, so that the participants are not detained for the occasion, since some of the participants may have already made arrangements for return journey to their working places.

Note: Disbursement of per-diem and T.A expenses shall be made during lunch break and during epidemiological exercises on the last day.

UNITWISE OBJECTIVES AND INSTRUCTIONS TO THE TUTOR

UNIT-1

INTRODUCTION TO MALARIA PROBLEM IN INDIA

Objectives :

i) various factors influencing the disease pattern in the community.

ii) nature of malaria infection.

iii) distribution of malaria and its important epidemiological characteristics.

iv) problem of malaria in India.

v) constraints in malaria control.

Instructions to Tutor

Discuss environmental factors, role of climate, distribution of malaria in the world, important characteristics of malaria transmission, focal & seasonal problem of malaria in India during forties, prevalence of holo, hyper, meso and hypo endemic areas in India, socio-economic aspects, give history of control measures, population break-up and results acheived. Describe strategy of eradication and achievement during this period. Reasons for switching over to Modified Plan of Operation. Strategies under Modified Plan of Operation and Malaria Action Programme (1995).

Teaching Aids

Transparencies on :

1. Malaria estimates in the pre-control era.
2. Pilot control measures.
3. Launching of NMCP in 1953 with objectives and achievements.
4. Launching of NMEP in 1958 with objectives and achievements.
5. Launching of MPO in 1977 with objectives and achievements.
6. Malaria incidence at different points of time - 1958-59, 1965, 1976-77, 1980, 1984, 1989, 1994.
7. MAP - Revised Strategy Objectives
8. Endemicity malaria maps of India (a) Pre-independent India b). 1994 or the latest year.

UNIT-2

LIFE CYCLE, TRANSMISSION AND MORPHOLOGY OF HUMAN MALARIA PARASITE

Objectives :

i) recall the various stages in the life cycle of malaria parasite in (a) human host, (b) mosquito vector.

ii) know why there are no relapses in infections with *P.falciparum* and *P.malariae.*

iii) define the incubation period of malaria infection with different species of malaria parasite.

iv) identify different stages of malaria parasite species under the microscope.

Instructions to Tutor

Describe the species of human parasites and the life cycle of malaria parasite in man and mosquito. Discuss in detail the tissue phase in liver parenchyma cells, presence of hypnozoites in *P.vivax* and *P.ovale* and the number of merozoites from cryptoschizont. Describe erythrocytic phase, duration of schizogony in different species, the number of merozoites, formation of hemozoin pigment, stippling in the host cell, schizogony in *P.falciparum*, band forms in *P.malariae* and gametogony with morphological description in different species & sex. Give details of sexual cycle, the reasons for calling the female *Anopheles* mosquito as definitive host, formation of gametes, zygote, ookinete, oocyst, the release of sporozoites and the duration of sporogony in different species. Describe microscopic differentiation of different species of malaria parasite. Give recapitulation of life cycle through diagramatic presentation.

Teaching Aids:-

Life cycle charts of different species. Microscopic demonstration of malaria parasites (different species and stages) to be shown during exhibition.

Transparencies on:

1. Pictorial life cycle of malaria parasite.
2. Exoerythrocytic tissue phase.
3. Erythrocytic schizogony.
4. Microscopic differentiation of malaria parasite species.
5. Gametogony.
6. Sporogony cycle.
7. Diagramatic presentation of life cycle in man.
8. Diagramatic presentation of life cycle in mosquito.

MALARIA VECTORS - MOSQUITOES AND THEIR BIONOMICS

Objectives :

i) define the vector.
ii) name different mosquito species of medical importance.
iii) know differences, important habits, distribution and sphere of influence of malaria vectors .
iv) understand common breeding sites of mosquito vector.
v) how malaria is transmitted?
vi) learn life cycle of mosquitoes.

Instructions to Tutor

Enumerate vectors of malaria, filariasis, dengue, JE and other viral infections. Describe place of mosquito in Class Insecta. Describe the body parts of the mosquito. Emphasise that only *Anopheles* transmit malaria. Out of many species, only 9 vectors transmit malaria in India.

Name of the Vectors

Describe different characteristics of *Anopheles, Aedes* and *Culex*. Discuss all four stages of mosquito. General bionomics of Indian vectors including their distribution, sphere of influence, endemicity, transmission, sporozoite rate, larval habitats, resting places, biting time, feeding habits, flight range and insecticide resistance should be discussed.

Discuss in detail the vectors in the region and only broad outlines are to be mentioned regarding the vectors which are not local.

Teaching Aids

1. Vectorial map - rural and urban
2. Video cassettes
3. Slides of mosquitoes - morphology indicating body parts
4. Vector morphology chart
5. Vector life cycle chart

Transparencies on :

1. Bionomics of *An.culicifacies*
2. " " *An.fluviatilis*
3. " " *An.philippinensis*
4. " " *An.stephensi*
5. " " *An.sundaicus*
6. " " *An.minimus*
7. " " *An.annularis*
8. " " *An.dirus*
9. " " *An.varuna*

UNIT-4

JOB RESPONSIBILITIES OF MEDICAL OFFICER PRIMARY HEALTH CENTRE

UNDER NMEP

Objectives :

i) discuss job responsibilities pertaining to NMEP.

ii) interact with the Medical Officers about the bottlenecks in discharging job responsibilities in the implementation of NMEP activities.

iii) suggest remedial measures in overcoming the difficulties in the discharge of responsibilities efficiently.

Instructions to Tutor

Panel Discussion

The Unit is to be discussed with the Medical Officers by three or four panel members from the District/Zonal/Regional/State/National experts available in the faculty. Each responsibility is to be discussed thoroughly and remedial measures to be suggested, if any bottlenecks are expressed in the discharge of responsibilties pertaining to NMEP activities.

Transparencies on :

1. Job responsibilities in Early Case Detection.
2. Job responsibilities in Prompt Treatment.
3. Job responsibilities on Insecticidal Spray.
4. Job responsibilities on Referral Services.
5. Job responsibilities on miscellaneous activities like training of peripheral workers, etc. pertaining to malaria.

UNIT - 5

MALARIA: CLINICAL PICTURE & DIFFERENTIAL DIAGNOSIS

Objectives:

i) diagnose a case of malaria clinically based on the sign and symptoms.

ii) suspect severe malaria and its complications.

iii) understand the necessity for early diagnosis and treatment of malaria especially in infants, children and pregnant women.

iv) differentiate cerebral malaria from other causes of coma.

v) order various investigations and interpret the results in malaria and its complications.

Instructors to Tutor

Describe clinical presentation of classical malaria and other sign & symptoms. Salient features of different species, suspected malaria fever cases and complications of *P.falciparum* malaria are to be discussed. Give details of differential diagnosis of cerebral malaria and the associated complications. Describe clinical picture of Black Water Fever. The variations in sign & symptoms among adults and children are to be enumerated. The common errors in diagnosis shall be highlighted.

Teaching Aids

Microscopic demonstration of different species and stages to be repeated on the second day of training.

Tranparencies on:

1. Clinical presentation of classical malaria.
2. Other sign & symptoms.
3. Salient features of malaria - Different species.
4. Suspected malaria fever cases.
5. Salient features of *P.falciparum* malaria.
6. Sign & symptoms of *P.falciparum* malaria.
7. Complications of *P.falciparum* malaria.
8. Differential diagnosis of cerebral malaria
9. Complications of cerebral malaria.
10. Black Water Fever.
11. Sign & symptoms in adults and children.
12. Errors in diagnosis .

UNIT - 6

SUPERVISION OF LABORATORY SERVICES

Objectives:

i) realise the importance of accurate and prompt microscopic confirmation of malaria diagnosis.

ii) judge the efficiency of laboratory technician.

iii) recognise the quality of staining of blood smear.

iv) assess the accuracy of microscopic diagnosis.

v) inspect the laboratory records and find out the accuracy of its maintenance.

vi) assess the epidemiological situation in the area.

vii) assess how passive agencies, FTDs, DDCs, and others are functioning.

viii) assess the efficiency of active case detection.

Instructions to Tutor

The importance of early microscopic examination of blood smears and prompt treatment of all malaria cases (EDPT) should be emphasised. Discuss essential aspects of microscopy and need for random checking of blood smears. The timelag between the blood smear collection, staining, examination of blood smears, despatch of results to the periphery and the administration of radical treatment should be inspected by the Medical Officers from the records and the tutor shall highlight the importance of EDPT for accelerating the Malaria Action Programme (MAP). Give salient points in cross-checking the field activities from the relevant records and how the records & charts are to be maintained up to date.

Transparencies on:

1. Importance of microscopy vis-a-vis chemotherapy.
2. Essential aspects of microscopy.
3. Checking random samples of blood smears.
4. Inspection of records - timelag.
5. Cross-checking of field activities from records.
6. Maintenance of records & charts at PHC.

ANTIMALARIAL COMPOUNDS, THEIR USE IN NMEP AND DRUG RESISTANCE

Objectives :

i) chronological development of antimalarial compounds.
ii) their action on pre-erythrocytic, asexual and sexual stages of parasite.
iii) their mode of action.
iv) their toxicity to human beings.
v) the use of antimalarials in NMEP.
vi) drug resistance and its distribution in India.

Instructions to for Tutor

Describe the use of antimalarials as per classification as well as curative and preventive aspects. Discuss the action of antimalarials and the factors influencing the efficacy. Give details of chemical groups. Describe agewise dosage schedules for presumptive and radical treatment in high and low risk areas and Chloroquine resistant *P.falciparum* areas. Discuss in detail the salient features of important antimalarials including long acting sulpha group, Artemisinin, Mefloquine, Halofantrine, etc. give details about chloroquine resistant foci in India and the Pf monitoring for liquidation of resistant foci.

Transparencies on:

1. Objectives
2. Use of antimalarials for treatment of malaria:prophylactic. or
3. Use of antimalarials for treatment of malaria: curative & preventive.
4. Action of antimalarials.
5. Factors influencing efficacy.
6. Chemical groups.
7. Presumptive treatment in low risk areas.
8. Presumptive treatment in high risk areas.
9. Presumptive treatment in *Pf* resistant areas.
10. Radical treatment for *P.vivax* and *P.malariae.*
11. Radical treatment in *Pf* resistant area.
12. Agewise dosage of sulpha combination.
13. Use of new antimalarials.
14. Use of Mefloquine.
15. Chloroquine resistant foci in India.
16. Chloroquine resistant Map of India.

UNIT - 8

DEVELOPMENT OF REFERRAL SYSTEM FOR MALARIA UNDER THE PRIMARY HEALTH CARE DELIVERY SYSTEM

Objectives :

i) need to develop a referral system for malaria.

ii) functions of different echelons of PHC personnel in treatment of malaria cases.

iii) the importance of developing liaison with CHC, Sub-Divisional and District Hospitals.

iv) drugs and equipment required for treatment of serious malaria cases.

Instructions to Tutor

Give details about the important aspects in the diagnosis of malaria and essential requirements needed in the referral centre. Discuss the role of peripheral workers in the identification of sign & symptoms of malaria, serious complications and criteria for referral to PHC. List the essential facilities to be provided for referral in PHC. Describe the criteria for referral to district hospital and the relevant records & case sheet to be sent along with the referral patient. Give referral links between PHC and CHC/District Hospital/Taluk Hospital.

Transparencies on :

1. Important aspects in diagnosis of malaria.
2. Essential requirements in referral centre.
3. Role of peripheral workers in the referral system.
4. Criteria for referral to PHC.
5. Essential facilities for referral in PHC.
6. Criteria for referral to District and Records to be sent.
7. Records to be sent along with the referred patient.
8. Referral links between PHC and CHC/District Hospital / Taluk Hospital.

UNIT - 9

MALARIA - CASE MANAGEMENT & SPECIFIC TREATMENT

Objectives :

i) specific treatment of malaria.
ii) treatment and management of complicated malaria.
iii) treatment of malaria in a) infants & children b) pregnancy
iv) requirement for case management under specific situations encountered in complicated cases of malaria.

Instructions to Tutor

Describe management of uncomplicated malaria caused by *P.vivax, P.malariae* and *P.falciparum* and then complicated *P.falciparum* malaria. Describe management of sign and symptoms such as hyperpyrexia, dehydration, acute renal failure, oliguria, hyperkalaemia, hypokalaemia, pulmonary oedema, gastrointestinal bleeding, jaundice & liver damage, shock, anaemia, hypoglycaemia, etc. Discuss nursing care and laboratory follow-up. Give details of management of pregnant women, treatment of infants & children. Case management & don'ts in the treatment shall be discussed in detail. Chemoprophylaxis, its disadvantages and recommended dose shall also be covered in the discussion.

Transparencies on :

1. Management of uncomplicated malaria.
2. Management of complicated *P.falciparum* malaria.
3. Management of hyperpyrexia and dehydration.
4. Management of acute renal failure and oliguria.
5. Management of hyperkalaemia, hypokalaemia and pulmonary oedema.
6. Management of gastrointestinal bleeding, jaundice and liver damage.
7. Management of shock, anaemia, PCV less than 20%. Hb less than 7 gm and hypoglycaemia
8. Nursing care.
9. Laboratory follow-up.
10. Management of pregnant women.
11. Treatment of infants & children.
12. Resume of common complications for management.
13. Don'ts in management.
14. Chemoprophylaxis.

UNIT - 10

INVESTIGATIONS INTO DEATH DUE TO MALARIA

Objectives :

i) investigations into death due to malaria.

ii) epidemiological significance of malaria deaths.

iii) how to avoid wrong classification of deaths which are likely to inflate the figure

Instructions to Tutor

Discuss in detail the epidemiological investigation on death due to malaria and the limitation of time between death and investigation. The tutor should emphasise that *P.falciparum* only is the direct cause of malaria deaths. Concomitant malaria infection in many seriously ill patients should be looked into before concluding the cause of death. The investigatior should record the relevant information such as the place of symptoms first noticed, medical history, statements from relatives, medical & paramedical personnel, details of drugs administered, route of drug administration, chronological order of events. Postmortem report if available, time lag in the diagnosis and treatment, etc. The sub-items of the proforma should be discussed thoroughly.

Transparecies on:

1. Epidemiological investigation: Place of first sign & symptoms, place of death, time lag of investigation.
2. Mortality due to *P.falciparum*: Pathological changes leading to death, concomitant infection, etc.
3. Investigation on death due to malaria: Case history antimalals & other drugs administered and the route of administration.
4. Investigation : Details of sub-items in the proforma, particulars of physicians attended the case, time lag in the diagnosis & treatment, remedial measures in the localities, etc.

UNIT - 11

STRENGTHENING OF SURVEILLANCE MECHANISM MONITORING, ASSESSMENT AND EVALUATION

Objectives :

i) differentiate between monitoring, assessment and evaluation of a programme.

ii) identify various components of programme activities to be monitored.

iii) remember when and at what period of the year, each activity is given priority for monitoring.

iv) draw logical conclusions during the process of monitoring and formulate the remedial actions to improve programme implementation.

Instructions to Tutor

Define the terms Monitoring, Assessment and Evaluation with explanatory note to distinguish the terms. Give the salient aspects and follow-up action consequent to Monitoring by MO-PHC. Discuss different parameters used in the Monitoring. Describe the frequency of Assessment along with parameters. Explain important points pertaining to Evaluation.

Transparencies on:

1. Definition of Monitoring, Assessment and Evaluation.
2. Important points pertaining to Monitoring by MO-PHC.
3. Salient aspects of Monitoring and follow-up action consequent to Monitoring.
4. Parameters in Monitoring.
5. Salient points pertaining to Evaluation.

UNIT - 12

PLANNING OF INTERVENTION MEASURES FOR TRANSMISSION CONTROL

Objectives :

i) about the preliminary information which is essential for planning of intervention measures.

ii) how to analyse the preliminary information and utilise the same while planning intervention measures.

iii) various transmission control/intervention measures.

iv) how to plan residual insecticidal spraying.

v) how to supervise the spray operations.

Instructions to Tutor

Discuss the relevant information needed for planning control measures. Explain the investigations to be carried out both parasitological and entomological during transmission period. Describe various transmission control measures and personal protection methods. Give exercises for selection of population for residual insecticidal spray with due priority to high risk areas as recommended by the Expert Committee on Malaria (1995). Discuss salient aspects pertaining to vector resistance vis-a-vis change of insecticide. Describe procurement of insecticide & its distribution and explain how to calculate manpower required for the spray. Discuss the details of advance spray programme, its execution and supervision.

Teaching Aids

Keep the microscopic demonstration of different stages of malaria parasites on third day also.

Transparencies on :

1. Information needed for planning control measures.
2. Investigations to be carried out regarding transmission period.
3. Transmission control measures.
4. Selection of population for residual insecticidal spray.
5. Insecticidal requirement.
6. Vector resistance to insecticide & change of insecticide.
7. Procurement & distribution of insecticide and manpower required for spray.
8. Advance spray programme, spray execution and supervision.

UNIT - 13

INFORMATION, EDUCATION AND COMMUNICATION ON MALARIA CONTROL

Objectives :

i) understand the importance of IEC for community co-operation and participation in the successful implementation of Malaria Action Programme.

ii) create awareness and change the attitudes and practices among the members of the community about the cause, prevention, early treatment and management of malaria leading to the reduction in the mortality and morbidity.

iii) create awareness and healthy practices about the drastic reduction in the frequency of contact between man and mosquito by using personal prophylactic measures especially use of impregnated bednets.

iv) create awareness and change the attitudes, practices and demand among masses regarding various methods which will bring about reduction in the parasite load in the community through early case detection and prompt treatment.

v) create awareness and healthy practices on the methods which can bring about reduction in the mosquitogenic conditions through bio-environmental and chemical control methods.

vi) create awareness about the importance and demand of achieving over 80 per cent coverage of targeted rooms during every round of indoor residual insecticidal spray operations.

Instructions to Tutor

Describe the purpose, general objective and specific objectives of IEC.(The Operational Manual on Malaria Action Programme may also be referred by the tutor on relevant aspects of IEC). Discuss the strategy and media mix for effective implementation of IEC. The tutor may identify the responsibility at Central, State and peripheral levels. The guidelines for observation of Malaria Week at various levels with main activities especially at peripheral levels shall be discussed. Responsibility of MO-PHC in the implementation of IEC shall be emphasised in the lecture-discussion. Salient points to be covered in IEC shall be listed by the tutor.

Transparencies on :

1. Purpose and objectives of IEC.
2. Strategy and media mix.
3. Responsibilities of IEC at various levels.
4. Observation of 'Malaria Week' : Guidelines.
5. Malaria - Week - Main Activities.
6. Responsibility of MO-PHC.
7. Salient points to be covered in IEC .

UNIT-14

EPIDEMIOLOGY OF MALARIA

Objectives :

i) distribution of malaria in terms of time, place and person.

ii) factors governing the endemicity of malaria.

iii) effect of environment on transmission of malaria.

iv) how different factors have a bearing on malaria transmission and influence the planning and evaluation of malaria control.

Instructions to Tutor

Classify the areas on the basis of spleen rate in children. Discuss in detail various epidemiological factors related to parasite species, gametocytes, incubation interval, seasonal variation in respect of *P.vivax* and *P.falciparum*, environment, vectors, human host, genetic variation in the endemic population and human immune mechanism.

Transparencies on :

1. Endemicity classification as per WHO.
2. Factors related to parasite species.
3. Factors related to gametocytes.
4. Incubation interval & seasonal variation.
5. Environmental factors.
6. Vectorial factors.
7. Host factors.
8. Genetic factors.
9. Human immune mechanism.

UNIT - 15

MONITORING OF EPIDEMIOLOGICAL AND ENTOMOLOGICAL PARAMETERS

FOR ADVANCE ACTION AND FOLLOW-UP OF EPIDEMIC

Objectives :

i) advance action to prevent or liquidate the epidemic.

ii) follow-up to study the impact of remedial measures undertaken.

Instructions to Tutor

Explain the nature and cause of epidemics. Identify the role of MO/PHC and DMO in monitoring epidemiological parameters for undertaking advance action. Explain with sufficient examples and exercises on how to calculate each parameter and its epidemiological significance. The epidemiological parameters to be covered in the lecture - discussion are i). ABER & MBER ii). API iii). AfI iv). SPR v). SfR and vi). Pf%. Only the relevant aspects of entomological parameters such as i) Hand collection method, ii) Pyrethrum spray collection iii) Human bait & human baited traps iv) infection & infectivity rates are to be discussed.

Transparencies on :

1. Nature and cause of epidemics.
2. Role of MO-PHC/DMO in monitoring and containment of epidemic.
3. Epidemiological parameters : Efficacy & adequacy of surveillance.
4. ABER/MBER: Calculation formula & significance.
5. API and AfI: Calculation formula & epidemiological significance.
6. SPR: Calculation formula and epidemiological significance.
7. SfR and Pf%: Calculation formula and epidemiological significance.
8. Entomological parameters: Correlation with epidemiological parameters.
9. Adult vector density: Hand collection method: Method of calculation and significance.
10. Pyrethrum spray collection: Significance.
11. Man - Mosquito contact: Significance.
12. Sporozoite rate: Method of calculation and significance.

UNIT-16

SELECTION OF HIGH RISK MALARIOUS AREAS (SUBCENTRE-WISE) ON THE BASIS OF CRITERIA DEVELOPED BY THE EXPERT COMMITTEE ON MALARIA, 1995

Objectives :

i. compile data for identification of worst affected 'high risk' malarious areas in the PHC

ii. list out the subcentres based on the criteria recommended by the Expert Committee on Malaria (1995) by adopting prescribed methodology.

iii. highlight the subcentres requiring indoor residual spray on the basis of MPO guidelines.

Instructions to Tutor

The tutor may also refer the Operational Manual of Malaria Action Programme (MAP), 1995 besides consulting the detailed note, pertaining to the Unit. Only 'High Risk Rural' areas are to be identified as per the criteria laid down by the Expert Committee on Malaria - 1995. The tutor should give at least one exercise for each criteria so that the participants will be able to identify the criteria under which the subcentre could be classified as high risk area. The examples given in the Annex should be discussed to make the participants familiar with the criteria.

Transparencies on :

1. Identification of high risk areas as per criteria recommended by the Expert Committee on Malaria - 1995.
2. Methodology for selection of high risk areas.
3. Table to be completed at PHC for selection of high risk subcentres.

UNIT - 17

MANAGEMENT INFORMATION SYSTEM IN MALARIA CONTROL

Objectives :

i) the importance of each form used in NMEP especially those to be maintained by the peripheral health worker, PHC laboratory and maintenance of registers, charts, graphs, tables, etc. at PHC.

ii) the timely submission of complete, accurate and relevant data to the concerned in the prescribed forms.

iii) collection and interpretation of information to take corrective measures immediately.

Instructions to Tutor

Describe the purpose and flow of information pertaining to Malaria Action Programme. Enumerate the charts and registers to be maintained at PHC. (The tutor may consult the Operational Manual for Malaria Action Programme 1995 for different charts and registers to be kept at PHC). The collection of data at subcentre level and the utilisation of information for monitoring the programme at different levels should be covered in the Lecture-Discussion. Discuss different MF forms including the new forms giving more emphasis to the forms to be maintained at PHC. Give brief account of use of MIS at the Dte. of NMEP.

Transparencies on :

1. Purpose and flow of information under MIS
2. Charts and registers to be maintained at PHC
3. Data collection at subcentre and utilisation at different levels
4. MIS in NMEP
5. Use of MIS at the Directorate of NMEP

UNIT - 18

MALARIA EPIDEMICS/FOCAL OUTBREAKS - CONTROL AND FOLLOW - UP

Objectives :

i) define the epidemic
ii) delineate the area affected with epidemic in his PHC
iii) know various measures undertaken to control an epidemic
iv) plan and provide logistic support for epidemic control
v) participate in implementation of the remedial measures
vi) help in epidemiological investigation to ascertain the cause of epidemic

Instructions to Tutor

Introduce technique of monitoring of epidemiological parameters. Define epidemic. Enumerate key factors responsible for epidemic, parasite load, vector bionomics, population dynamics, environmental and climatological factors, go on to describe monitoring of malaria incidence, study of trends, cross-checking of laboratory results to verify trends, delineate all affected areas by rapid survey including fever survey, mass survey, keeping records of population involved. Measures for liquidation of foci, antivector measures like space spray, residual spray, entomological investigations necessary, follow-up action, detailed planning of epidemic control, analysis of results and reporting to different authorities, role of Medical Officer, PHC, DMO and Mobile Unit. Under insecticide discuss calculation of manpower and insecticide required. Show the four proformae given in the Operational Manual on epidemics and discuss the need of each proforma.

Teaching Aids

1. Definition and types of epidemics
2. Key factors for monitoring, prediction and early case detection of malaria outbreaks
3. Monitoring of malaria incidence 4. Cross-check of laboratory results
5. Delineation of affected area through rapid and mass survey
6. Estimation of population involved 7. Measures for liquidation of foci
   a. Anti-vector measures b. Other measures c. Entomological investigation d. Duration of epidemic control measures e. Follow-up action
8. Detailed planning of epidemic control measures
   a. Manpower requirement b. Material requirement c. Proformae for recording field data
   d. Anti-vector measures e. Mass survey proforma
9. Spray squads 10. Reporting system

UNIT-19

INTEGRATED VECTOR CONTROL MEASURES WITH FEASIBLE BIO-ENVIRONMENTAL CONTROL METHODS IN HIGH RISK AREAS AND USE OF IMPREGNATED BEDNETS

Objectives :

1. acquaint with different bio-environmental control methods
2. implement bio-environmental control methods wherever feasible through intersectoral co-ordination
3. learn the technique of impregnating the bednet and highlight the benefits of impregnated bednets as a personal protection measure among the community members

Instructions to Tutor

Give introduction to the subject before playing the video cassettes. Allow 15 minutes discussion after playing video cassettes. The suitable bio-environmental control measures in different malaria paradigms shall be discussed.

Teaching Aids

1. Video cassettes on bio-environmental control methods
2. Video cassettee on use of impregnated bednet
3. Demonstration showing impregnation technique of bednet

UNIT - 20

TRAINING OF PERIPHERAL STAFF BY MEDICAL OFFICER OF PHC

Objectives :

i) the importance of training the peripheral staff under his administrative control.

ii) the method of conducting training course based on the job requirements of each category.

iii) the preparation/utilisation of proper training aids for each course curriculum.

Instructions to Tutor

The tutor may refer Annex-9 of Operational Manual for MAP on training needs of peripheral workers. Give norms of establishment of FTD, DDC, VLW, MPW and Microscopist as per size of population. The method of training to be conducted for each category of worker based on the job responsibilities should be highlighted and relevant aspects pertaining to job responsibilities should be covered in imparting training for efficient discharge of the role of worker in the Malaria Action Programme. All the prerequisites needed for the training centre should be discussed thoroughly and the method of drawing calendar of activities for training should be covered. (The training curriculum for each cadre of peripheral worker will be supplied to MO-PHC before the actual training would commence for grassroots level workers).

Transparencies on :

1. Norms for establishment of FTD, DDC, VLW, MPW and Microscopist as per size of population
2. Category of peripheral workers to be trained
3. Salient points for designing training curriculum
4. Essential components of training

APPENDICES

APPENDIX - 1

PRE-TEST PAPER

Name of the Participant:.....

Designation:.....:.....

Address:.....:.....

Model Paper for Multiple Choice Questions (MCQ)

Tick (✓) one choice only which is the nearest correct answer

1. **Why *P.falciparum* peak usually appears 6 to 8 weeks after the peak of *P.vivax*?**
   (a) Due to delayed release of hypnozoites
   (b) Due to shorter sporogony but very prolonged schizogony
   (c) Due to longer sporogony and late gametogony
   (d) Due to innate immunity developed by the human host.

2. **Which species of human malaria parasites do not possess hypnozoite stage in the hepatocytes?**
   (a) *P.vivax* and *P.falciparum*
   (b) *P.falciparum* and *P.malariae*
   (c) *P.malariae* and *P.ovale*
   (d) *P.ovale* and *P.vivax*

3. **What is the synonym of Ookinete?**
   (a) Zygote
   (b) Microgamete
   (c) Travelling vermicule
   (d) Oocyst

4. Which type of area is classified as hyper endemic?

(a) Spleen rate in 2-9 years age group does not exceed 10%

(b) Spleen rate in 2-9 years age group is between 11 and 50%

(c) Spleen rate in 2-9 years age group is between 51 and 75% and <25% in adults.

(d) Spleen rate in 2-9 years age group is over 75% and low in adults.

5. What is the daily dose of 8 aminoquinoline for a 11 month old child having *P.vivax* infection ?

(a) Nil

(b) 2.5 mg

(c) 7.5 mg

(d) 15 mg

6. What is the ideal method for control of malaria in tropical aggregation of labour?

(a) By employing the local population only

(b) By importation of labour from malaria free zones

(c) By mass vaccination

(d) By screening and surveillance for detection and treatment of labourers and others living in the area

7. Which of the following is not contributed by construction activity?

(a) Creation of more breeding places

(b) Creation of high humidity increasing the longevity of vector

(c) Creation of aggregation of immune and non-immune human population bringing different strains of malaria parasite

(d) Promotion of very high immunity among the inhabitants resisting the infection

8. How many spray squads are required to cover 5 lakhs population in a single round to be completed in ten weeks as per NMEP norm?

(a) 44 squads

(b) 22 squads

(c) 11 squads

(d) 5 squads

9. How much is the requirement of Malathion 25% wp to cover 10 houses each having an average sprayable surface area of 150 sq.metres?

(a) 6 kg

(b) 12 kg

(c) 24 kg

(d) 40 kg

10. How many tablets of Chloroquine (150 mg. each) are consumed for presumptive treatment in population of 5 lakhs showing 20 per cent ABER with no backlog of blood smears?

(a) 3 lakhs

(b) 4 lakhs

(c) 6 lakhs

(d) 10 lakhs

II Match the following

M1	Species	No.of tissue merozoites
	(a) *P.vivax*	30,000
	(b) *P.falciparum*	15,000
	(c) *P.malariae*	15,000
	(d) *P.ovale*	10,000

M2	Insecticide	Dose/sq.metre
	(a) DDT	2.0 gm
	(b) HCH	0.02 to 0.025 gm
	(c) Malathion	1.0 gm
	(d) Synthetic pyrethroids	0.2 gm.

M3	Vector	Infection
	1. *Xenopsylla cheopis*	(a) *Dracunculus medinensis*
	2. *Musca domestica*	(b) Dengue virus
	3. *Mesocyclops leuckarti*	(c) *Yersenia pestis*
	4. *Aedes aegypti*	(d) *Salmonella paratyphi*

M4	Species	Stippling
	1. *P.vivax*	(a) Zeimann's stippling
	2. *P.falciparum*	(b) Jame's stippling
	3. *P.malariae*	(c) Maurer's dots
	4. *P.ovale*	(d) Schuffner's dots

M5	Species	Duration of pre-erythrocytic cycle
1.	*P.vivax*	(a) 9 days
2.	*P.falciparum*	(b) 14-16 days
3.	*P.malariae*	(c) 8 days
4.	*P.ovale*	(d) 5½ -6 days

True or false

1. Hyper density of gametocytes also causes fever in vertebrate host.

True/false

2. Life cycle of malaria parasite in man is also known as Cycle of Ross

True/false

3. Pre-erythrocytic cycle is absent in *P.falciparum*

True/false

4. One female gamete is formed from one female gametocyte

True/false

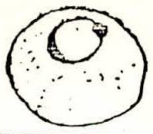
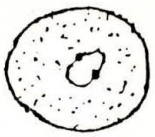
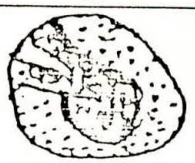
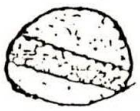
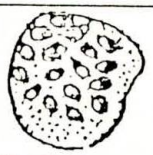
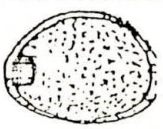
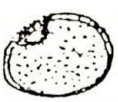
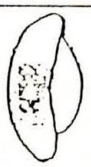
5. *Anopheles* vector is capacable of transmitting malaria within a week after taking infective blood meal

True/false

Expand the following

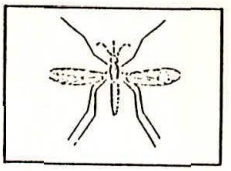
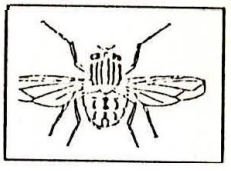
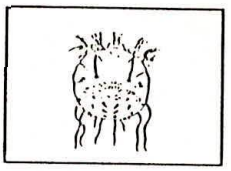
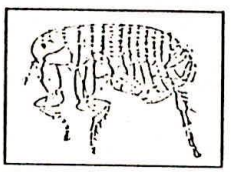
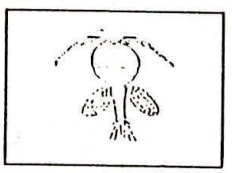
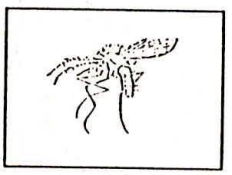
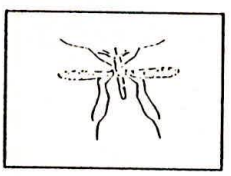
1 DDC
2 HCH
3 MPO
4 G6PD
5 JSB Stain
6 DDT
7 MLO
8 FTD
9 IPR
10 NMCP

Please identify the following human Plasmodia

S.No.	Figure	Species	Stage	Sex where applicable
1				
2				
3				
4				
5				
6				
7				
8				
9				
10				

Match the figures on the right side with the disease given on the left side

(as given for J.E.)

Plague	
Typhoid	
Japanese Encephalitis	
Scabies	
Malaria	
Guineaworm Disease	
Kala-Azar	

9. Do you try to convince the fever cases to give blood smear if they refuse to co-operate with the MPW?

10. Does the drug distributor give all the doses of drug personally to all the malaria confirmed cases?

11. Do you or any other villager rush the complicated cases of suspected malaria to the nearest clinic or hospital or PHC for immediate treatment?

12. Do you or any member of your family or neighbour go to faith healer for malaria treatment?

13. If so, what type of advice do you render to such person?

14. Do you receive advance notice of insecticidal spray?

15. Do you get all the rooms of your house sprayed with insecticide?

16. Do you get your house sprayed during every spray round?

17. Do you know why the insecticide is sprayed in the houses?

18. Do you advise members of the family to sleep indoors after insecticidal spray to avoid mosquito biting?

19. Do you keep utensils, food articles, drinking water and fodder protected from insecticidal contamination when spray is undertaken?

20. Do you ensure that the houses are not locked when spray squads visit your locality for spraying?

Name of the Investigator.....

Designation.....

Address.....

EXERCISE-3. In a village having a population of 2000, two new malaria cases were recorded in December 1994. The progressive total cases recorded in the preceding month were 8 during the same year. Six cases were treated and cured , while the remaining cases persisted with infection.

(a) What was the incidence in December?

(b) What was the API for 1994?

(c) What was the point prevalence in December?

EXERCISE-4.

In one of the PHCs the agewise break-up of malaria cases was as follows:

Age Group	No. of malaria cases	% of total	No. examined	Positive Rate (%)
< 1 year	10	0.5	1092	0.9
1-4 Years	425	22.0	6188	6.9
5-14 Years	450	23.3	7644	5.9
> 14 years	1048	54.2	21476	4.9
Total	1933	100.0	36400	5.3

(a) Which age group had the highest percentage of cases?

(b) Which age group was at the greatest risk of contracting malaria?

(c) Why the above two answers are different?

EXERCISE-5.

In a forest fringe village in Keonjhar district of Orissa the incidence of malaria among villagers who frequent the forest was 12/1000 persons while the same among the villagers who do not go into the forest was 3/1000 persons.

(a) Find the relative risk of malaria among villagers frequenting forest?

(b) Interpret your findings in words.

(c) Calculate the risk difference between the above two groups

(d) Interpret your findings in words.

EXERCISE-6.

In a PHC having 30,000 population, 4320 fever cases were blood filmed. The microscopic examination revealed 180 malaria cases and 108 of them were *Pfalciparum* infection. During the year 45 people died due to confirmed deaths due to malaria out of total 300 deaths in the village

(a) Find ABER, SPR, SfR, API, AfI and Pf %

(b) What was malaria case fatality rate?

(c) What was crude death rate?

(d) What was malaria mortality rate?

EXERCISE-7.

In a spleen survey conducted on 2-9 years age group of 200 children the results were as follows:

Classes of Spleen.	No.of various classes found
0 (not palpable)	92
1	63
2	32
3	7
4	4
5	2
	Total = 200

(a) What was the spleen rate and Average Enlarged Spleen index?

(b) If in the above village the spleen rate among adults was 26%, how do you classify the degree of endemicity of malaria?

EXERCISE-8. In a village there are 200 human dwellings. The average sprayable area is 150 sq metres for a human dwelling.

What will be the requirement of:-

1. DDT 50% wp
2. BHC 50% wp
3. Malathion 25% wp
4. Synthetic pyrethroid 2.5 % wp
5. Synthetic pyrethroid 10% wp

(The dosage for synthetic pyrethroid 2.5% wp is 20 mg/per sq.metre and for 10% wp is 25 mg/ sq.metre).

APPENDIX-4

POST-TEST PAPER

Name of the Participant:.....

Designation:.....:.....

Address:.....:.....

Model Paper for Multiple Choice Questions (MCQ)

Tick (✓) one choice only which is the nearest correct answer

1. Which of the following do not generally constitute severe manifestation and complication of malignant malaria?
   (a) Hyperpyrexia & Cerebral involvement
   (b) Renal dysfunction, Haemoglobinuria & jaundice
   (c) Lymphangitis & Lymphadenitis
   (d) Pulmonary oedema & Hypoglycaemia
2. How much will be SPR when ABER is 10% and API is 2.6?
   (a) 1.3%
   (b) 2.0%
   (c) 2.6%
   (d) 5.2%

3. Why *P.vivax* peak usually appears 6 to 8 weeks earlier to *P.falciparum* peak?
   (a) Due to quick release of hypnozoites
   (b) Due to shorter sporogony and early gametogony
   (c) Due to predilection for younger RBC
   (d) Due to absence of early immunity

4. Which of the following species of human malaria parasite possess hypnozoite stage in the hepatocytes?

(a) *P.vivax* and *P.falciparum*

(b) *P.malariae* and *P.ovale*

(c) *P.vivax* and *P.ovale*

(d) *P.malariae* and *P.vivax*

5. Which type of area is classified as meso-endemic?

(a) Spleen rate in 2-9 years age group does not exceed 10%

(b) Spleen rate in 2-9 years age group is between 51 and 75% and <25% in adults

(c) Spleen rate in 2-9 years age group is over 75% and low in adults

(d) Spleen rate in 2-9 years age group is between 11 and 50%

6. Why mosquito is a definitive host in respect of malaria parasite?

(a) It transmits infection from man to man

(b) The parasite propagates sexually in the mosquito

(c) The development of parasite takes place in 10-14 days

(d) A large number of vector mosquitoes can become infective from a single vertebrate carrier

7. Erythrocyte schizogony of the *P.falciparum* usually takes place

(a) in peripheral circulation

(b) in pleural cavity

(c) in peritoneal fluid

(d) in capillaries of internal organs

8. Band forms of trophozoites are found in

(a) *P.vivax*

(b) *P.falciparum*

(c) *P.malariae*

(d) *P.ovale*

9. What is the requirement of malathion 25% wp for a population of 1,00,000 for one round?

(a) 15 m.tons

(b) 30 m.tons

(c) 112 m.tons

(d) 300 m.tons

10. How many approximate no. of tablets of Chloroquine (each 150 mg base) are required for presumptive treatment in a population of one lakh showing 10% ABER with no backlog of blood smears?

(a) 10,000 Tablets

(b) 20,000 Tablets

(c) 30,000 Tablets

(d) 1,00,000 Tabs

True or False

1. Cattle sheds are not to be sprayed as per the revised Operational Guidelines (1995) of NMEP

True or False

2. Life cycle of malaria parasite in man is called "Cy cle of Golgi"

True or False

3. Hyper density of gametocytes causes irregular fever in *P.falciparum*

True or False

4. Malaria and Filaria are the only human parasitic infections transmitted by the mosquitoes in the world

True or False

5. Mixed infection means all asexual stages are present in the peripheral blood smear

True or False

6. Natural light from north direction is ideal for microscopic examination

True or False

7. Exflagellation takes place in respect of macrogametocyte

True or False

8. Infants and Pregnant women are not to be administered Primaquine

True or False

Expand the following

1 MAP
2 VLW
3 NMCP
4 ABER
5 IPR
6 R III
7 BHC
8 PMHD
9 PSC (vector density parameter)
10 DDT

II - Match the Following

M.I.	Species	Duration of erythrocytic Schizogony
	(a) *P.vivax*	(i) 72 hours
	(b) *P.falciparum*	(ii) 50 hours
	(c) *P.malariae*	(iii) 48 hours
	(d) *P.ovale*	(iv) 48 hours

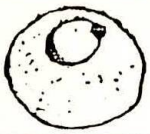
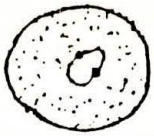
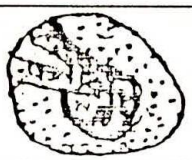
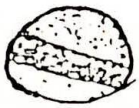
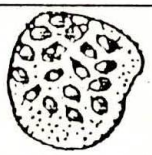
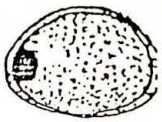
M.II	Species	Approximate no. of merozoites in erythrocytic schizont
	(a) *P.vivax*	(i) 8
	(b) *P.falciparum*	(ii) 8
	(c) *P.malariae*	(iii) 16
	(d) *P.ovale*	(iv) 24

M.III	Insecticide/larvicide	No. of spray rounds
	(a) DDT/Deltamethrin	(i) whenever malaria +ve case is detected
	(b) MLO/Temephos	(ii) Three rounds a year
	(c) BHC/Malathion	(iii) Two rounds a year
	(d) Pyrethrum (space spray)	(iv) Weekly

M.IV.	Landmark	Discoverer
	(a) Extrinsic cycle	(i) Stephens
	(b) *P.malariae*	(ii) Jaswant Singh & Bhattacharjee
	(c) *P.falciparum*	(iii) Sir Ronald Ross
	(d) Malaria Stain	(iv) Laveron

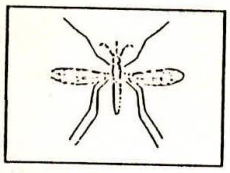
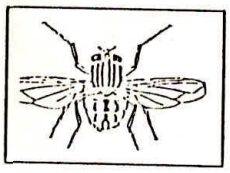
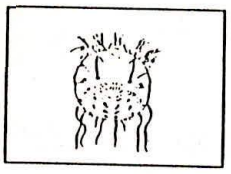
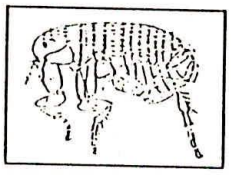
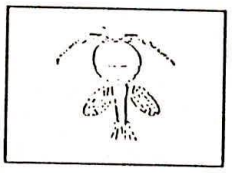
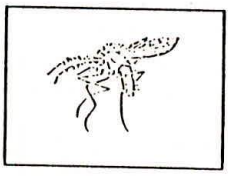
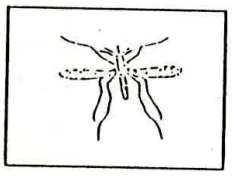
M.V.	Stage	Habitat
	(a) Hypnozoites	(i) Capillaries of bone marrow
	(b) Sporozoites	(ii) Hepatocytes
	(c) Trophozoites	(iii) Salivary glands
	(d) Immature *Pf* gametocytes	(iv) Erythrocytes

Please identify the following human Plasmodia

S.No.	Figure	Species	Stage	Sex where applicable
1				
2				
3				
4				
5				
6				
7				
8				
9				
10				

Match the figures on the right side with the disease given on the left side.

(as given for J.E.)

Plague	
Typhoid	
Japanese Encephalitis	
Scabies	
Malaria	
Guineaworm Disease	
Kala-Azar	

APPENDIX-5

PROFORMA FOR EVALUATION BY PARTICIPANTS

(Anonymous)

Q.1. Do you consider the training workshop useful?

Q.2. Which aspects of the training need more emphasis?

Q.3. Whether the duration of training is adequate? If not, kindly suggest required duration with reasons.

Q.4. What level of officers do you recommend for similar training course in future?

Q.5. Is the material supplied in the training sufficient? If not, kindly suggest what other material is to be supplied ?

Q.6. Would you be able to implement the new action plan in your area without hurdles. If not, kindly give the reasons and remedial measures ?

Q.7. Would you suggest capsule courses for peripheral workers involved in NMEP ?

Q.8. Any other suggestions & remarks.

APPENDIX-6

SUGGESTED TIMETABLE FOR MEDICAL OFFICERS OF PRIMARY HEALTH CENTRES FOR 5 DAYS' TRAINING

Time	Activity	Faculty
I Day		
09.00-10.00	Registration	
10.00-10.30	**Inaugural Function**	
	i. Introduction of Participants & Faculty	
	ii. Welcome Address - Local Health Authority	
	iii. Objectives of Training - Course Director	
	iv. Key Note Address - Chief Guest	
	v. Vote of Thanks - Local Organiser	
10.30-11.00	Inaugural Tea	
11.00-11.30	**Exhibition: should include the following:-**	
	i. Charts on life cycle of MP/*Anopheles*. Maps, Graphs, Tables & Photographs depicting epidemiology & control aspects of malaria. Posters on environmental sanitation, IEC.Pictorial exhibition of the malariogenic situations in the State. Tables/Graphs of malaria incidence in different years/months & trend in the the State and District. Map of problem Districts & PHCs. FTDs, DDCs.	
	ii. Live demonstration of mosquito stages. Pinned malaria vectors in the region focussed under simple microscope.	

	iii.	Microscopic demonstration of malaria parasite
	iv.	Spray equipment & other control measures - Bio-environmental and chemical. Efficacy of larvicides.
	v.	Personal prophylactic measures - Models on impregnated bednets, mosquito proofing of house.
11.30-12.00		Pre-test
		Lecture-Discussion
12.00-13.00	Unit 1.	Introduction to Malaria problem in India
13.00-14.00		Lunch
		Lecture-Discussion
14.00-15.00		Malaria problem in the State; problem Districts & PHCs -State Faculty
		Lecture-Discussion
15.00-16.00	Unit 2.	Life cycle, transmission and morphology of human malaria parasite
		Lecture-Discussion
16.00-17.30	Unit.3	Malaria vectors - mosquitoes and their bionomics
II Day		
10.00-11.00		Panel Discussion
	Unit.4	Job Responsibilities of MO-PHC under NMEP
11.00-12.30		Lecture-Discussion
	Unit 5.	Malaria: Clinical Picture & Differential Diagnosis
12.30-13.00	Unit 6.	Supervision of Laboratory Services
13.00-14.00	Lunch	
14.00-15.30		Lecture-Discussion
	Unit 7.	Antimalarial Compounds, their use in NMEP and Drug Resistance.

15.30-17.00		Lecture-Discussion
	Unit 8.	Development of referral system for malaria under PHC delivery system;
		Lecture-Discussion
	Unit 9.	Malaria: Case Management & Specific Treatment.
		Lecture-Discussion
	Unit 10.	Investigations into death due to malaria.
17.00-17.30		Lecture-Discussion
	Unit 11.	Strengthening of Surveillance, Monitoring, Assessment and Evaluation
III-Day		
10.00-11.00		Lecture-Discussion
	Unit 12.	Planning of intervention measures for transmission control -
11.00-11.45		Lecture-Discussion
	Unit 13.	Information, Education and Communication on malaria control
11.45-13.00		Lecture-Discussion
	Unit 14.	Epidemiology of malaria
		Lecture-Discussion
	Unit.15.	Monitoring of Epidemiological and Entomological parameters for advance action and follow-up of Epidemic.
13.00-14.00		Lunch
14.00-15.00		Lecture-Discussion
	Unit 16.	Selection of high risk malarious areas (subcentre-wise) on the basis of criteria developed by the Expert Committee on Malaria, 1995.
15.00-16.00		Lecture-Discussion
	Unit 17.	Management Information System in malaria control
16.00-17.00		Lecture-Discussion
	Unit 18.	Malaria epidemics/focal outbreaks - Control and follow-up.
17.00-17.30		Briefing to participants on field visit.

IV Day

09.00-13.00

Field visit to a PHC

The following aspects will be covered in the field visit through practical demonstration& discussions

1. **Active case detection**

i. Domiciliary visits & wall stencilling

ii. Fever survey & collection of blood slides

iii. Recording & method of despatching the blood smears

iv. Presumptive & Radical treatment

2. **Passive case detection**

i. Malaria clinics & their function

ii. Dispensaries & Private practitioners of allopathic & indigenous system of medicine

iii. Functioning of DDCs & FTDs

iv. Exchange of information with " Voluntary Link Worker".

4. **IEC for community participation**

i. Community role in the successful indoor residual spray - Discussion with opinion leaders and householders. Reasons for refusal of spray, if any.

ii. Personal prophylactic measures, prevention of peri-domestic & domestic mosquito breeding; anti-larval measures in selected situations.

iii. Visits to school & panchayat for creating awareness of anti-malaria activities

iv. KAP study on a predesigned proforma

13.00-14.00 **Lunch**

14.00-18.00

5. **Demonstration of indoor residual spray**

i. Calculation of population for spray and seasonal spray staff.

ii. Formulation of suspension of adulticides and larvicides.

iii. Spray equipment & measurement of nozzle discharge rate. Demonstration of technique for indoor residual spray, indoor pyrethrum space spray and larvicide spray. Calculation of dose of active ingredients.

iv. Precautions to be observed during spraying, safe handling and storage of insecticides.

6. Laboratory Demonstration

i. Practical demonstration of processing of fever survey blood smears collected in the field visit and staining with JSB stains.

ii. Sample examination of blood smears.

iii. Maintenance of Lab. equipments.

iv. Maintenance of lab. records.

v. Supervision of lab. services including time lag between blood smear collection & radical treatment.

vi. Demonstration of malaria parasite & mosquito.

7. Evaluation of anti-malaria activities

i. Up to-date maintenance of relevant forms, records, charts, graphs, maps, etc., in the PHC.

ii. Visit to PHC stores for the maintenance of logistics and storage procedure.

iii. Analysis of reports with malariometric indices.

iv. Discussion points for presentation of field reports

V Day

10.00-11.00 Lecture Discussion & Video Film shows

Integrated vector control measures with feasible bio-environmental control methods in high risk areas (Video Film show).

Unit 19. Use of impregnated bednets. (Video Film show)

11.00-12.00 Review of important aspects of all the topics.

12.00-13.00 Lecture - Discussion

Unit 20. Training of peripheral staff by MO-PHC

13.00-14.00 **Lunch**

14.00-16.00 **Practical Exercise**

Epidemiological & Skill learning exercises

16.00-16.30	Post-test
16.30-17.00	Evaluation of training by participants
17.00-17.30	**Concluding Session**

i. Distribution of certificates by the Chief Guest

ii. Remarks by the Chief Guest

iii. Remarks by Participants.

iv. Remarks by the Regional/State Training Co-ordinators

v. Vote of thanks by Chief Local Organiser.