

REPORT ON THE INTER-REGIONAL TECHNICAL MEETING
ON MALARIA ERADICATION

Teheran, 1-6 May 1962

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1. INTRODUCTION

The Inter-Regional Technical Meeting on Malaria Eradication was held at the Students' Club of the University, Teheran, Iran, from 1-7 May 1962. His Excellency Dr Ebrahim Riahi, Minister of Health of the Imperial Government of Iran, presided. In his address to the meeting, he emphasized the importance of eradicating malaria from this modern progressive world, and the progress which has so far been achieved. He referred to the malaria programme in Iran, and the keen interest of the Imperial Government of Iran in eradicating malaria from the country, a feat which he was glad to say would reach completion in the foreseeable future.

Dr A. H. Taba, Regional Director of the Eastern Mediterranean Region of WHO, expressed his gratitude to the Imperial Government of Iran for having kindly agreed to allow the meeting to convene in Teheran, and to the participants for their co-operation. He spoke of the role of WHO in the world-wide programme of malaria eradication, and laid stress on the importance given by the Organization to the training of national personnel of all categories. Dr Taba also referred to the items of the provisional agenda, and emphasized the importance of the development of basic rural health services especially during the maintenance phase of eradication programmes, and the need for the full co-operation of neighbouring countries especially in regard to border areas, as well as in the exchange of information on the progress of their programmes.

Mr W. G. Middelman, Resident Director, United Nations Children's Fund, Eastern Mediterranean Area, and Dr Robert Macy, Director, United States Agency for International Development Mission in Iran, expressed their appreciation for being invited to such an important meeting dealing with one of the biggest international health undertakings. They gave assurance of the active participation of their respective agencies. Dr E. B. Weeks, Chief Programme and Planning of the Division of Malaria Eradication, WHO, Geneva, conveyed the greetings of the Director of the Division, Dr C. A. Alvarado, and mentioned the importance given, and the contributions expected, by all malaria eradication workers in the world. Dr Ch. Mofidi, Director of the Institute of Parasitology and Malariology of the University of Teheran, Iran, welcomed all the participants on behalf of the Dean of the University of Teheran and referred to the role of the Institute of Parasitology and Malariology in the Iranian malaria eradication programme.

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Representatives from the following countries were present: Afghanistan, India, Iran, Iraq, Pakistan, Syrian Arab Republic, Turkey and the USSR.

Dr P. Khabir, Director-General of the Department of Environmental Health and Malaria, Iran, Dr Goekberk, Director of the Malaria Institute of Adana, Turkey, and Dr A. P. Ray, Director of the National Malaria Eradication Programme, India, were elected Chairman, Vice-Chairman and Rapporteur respectively.

The provisional agenda prepared by the Conference Secretariat was adopted unanimously. It was decided to hold morning and afternoon sessions, the mornings being devoted to plenary sessions and the afternoons to both plenary sessions and working group committees. A field trip was undertaken on 4 May and 5 May to Gilan Province along the Caspian Sea, to observe the malaria eradication activities that are under way in this Province.

The Meeting closed on 7 May after having approved the recommendations prepared by the drafting committee, and after hearing the appreciation of all participants on the usefulness and contributions of such meetings.

2. REPORT ON DEBATES

2.1 Progress of Malaria Eradication with Particular Reference to Border Areas (Agenda item 1.)

A summary of the malaria eradication programmes in the participating countries, stressing the epidemiological activities in border areas is given in the Annex.

2.1.1 Afghanistan

In Afghanistan the national malaria control programme was converted into a malaria eradication programme in 1958. The programme will attain total coverage in 1962 with the inclusion of an additional 500 000 people in Badakshan Province, as well as those provinces bordering Pakistan and Iran.

During 1961, in order to ensure more effective supervision, the country has been divided into three regions, each in the charge of a regional malariologist. These regions are in turn divided into units, each covering on the average 200 000 population. WHO advisory assistance is provided at country and regional levels in Afghanistan. There were no serious technical or operational problems facing the programme. The malaria eradication programme in Afghanistan is run by stages and is expected to be completed by the end of 1969.

Afghanistan has common borders with the USSR, Iran and Pakistan. In 1961 surveys were carried out in Badakshan Province bordering the USSR. Most of this border consists of high mountain ranges without human habitation. The population in the remaining part of the border area shows a spleen rate ranging from 4 to 13 per cent., and a parasite rate between 1.5 to 20 per cent. These areas will be included in the 1962 spraying operations.

Between Afghanistan and Iran, the border runs through desert and it is reported that there is very little movement of population across this border. As the Pakistan programme is likely to take some time to reach the Afghanistan/Pakistan border, it may be necessary on the Afghanistan side to continue spraying along the points of inter-country communications.

2.1.2 India

Up to 1958, when the eradication programme started, 200 million people were being afforded protection under a nation-wide malaria control campaign. Consequent to the switch-over to eradication, the entire population, estimated at 390 million (based on the mid-decennial census) had to be covered. However, the 1961 decennial census and the malaria eradication surveillance enumeration carried out in 1960-1961 showed that the population in India was in the region of 438 million. This has necessitated a proportionate augmentation of staff in the malaria eradication organization.

By 1960, all 390 units had been fully established, each designed to cover a million population. Besides spraying operations, surveillance was initiated in 344 units in 1960 and in 20.5 in 1961. In those areas bordering neighbouring countries 25.5 units, covering about 25 million people carried out spraying operations only and surveillance operations were planned to be started after the neighbouring countries had reached an advanced stage in their eradication programmes. The programme in India received some assistance from US/AID and WHO. The number of medical officers working in the programme is about 450, in addition, there are about 100 entomologists and science graduates who may also be placed in charge of malaria eradication units. At present there are about 48 000 technical and sub-professional staff, but taking into consideration the spraying squads as well, the strength of the personnel deployed in the malaria eradication programme would be in the region of 150 000.

After four years' operations, the Government of India appointed six independent appraisal teams and three consultants to study the progress of the programme for the purpose of recommending spray withdrawal. During the appraisal, the criteria as laid down in the Eighth Report of the WHO Expert Committee on Malaria, were strictly followed and the teams had made recommendations for 140 units covering a population of 147 million to enter into the consolidation phase. This was finally approved by the consultants. Thus, more than one-third of the population in India has now in 1962 entered the consolidation phase.

For 1963 it is planned to withdraw spraying from a further 174 units and it is expected that a large majority of them will be able to fulfil the criteria for such withdrawal. Although it is difficult to forecast in a biological programme of this nature the exact future development, it is expected that about 280-300 units would be in the consolidation phase in 1963 and a further area with 70 million people would be ready to meet the criteria for malaria eradication by the end of that year.

During the first three years of the eradication programme, an amount equivalent to about US\$ 97 million has been spent. An amount equivalent to about US\$ 115 million has been planned to cover the next five years (1961/1962 to 1965/1966).

With regard to inter-country malaria co-ordination meetings, India has had three such sessions with Burma and two with Burma and Pakistan jointly. During these meetings, problems of mutual interest were discussed, with particular reference to operations in border areas of the three different countries. Besides, methods were evolved for speedy operation on either side of the border, as far as possible on a common pattern. A similar meeting was held with Nepal in 1961.

2.1.3 Iraq

The malaria control programme which was initiated in 1952 was switched over to one of eradication in 1957 with the assistance of WHO and UNICEF. The programme was expected to be completed in 1964. Out of a population of 4.5 million estimated to be at risk, 1.3 million are now in the attack phase, and 3.2 million in the consolidation phase. While active surveillance operations are well established, passive surveillance operations are not yet fully organized.

The main vectors in the northern and central regions are A. superpictus and A. sacharovi which so far continue to be susceptible to DDT even after seven years of spraying. A. stephensi is the main vector in the southern region. In the past it had been reported as far north as the border town of Khanaqin and high densities occurred there after floods causing epidemics. After the first application of dieldrin in 1958 against A. stephensi, the species disappeared and no specimens were found for nearly three years. In 1961, when dieldrin spraying was discontinued, A. stephensi reappeared (August 1961) and since then continues to be present in fair density. The species is now resistant to dieldrin and has a high tolerance to DDT.

During 1961 there were 813 malaria cases recorded from all over the country, out of which 740 cases were reported from Sulaimaniya and Erbil Liwas. Since November 1961 to date, no more cases have been reported from Mosul Liwa but continued transmission of malaria still exists in two mountainous Nahiyas in the two above-mentioned Liwas as a result of incomplete coverage in residual spraying, due to the practice of temporary population movement to crop huts and outdoor sleeping during summer.

2.1.4 Iran

The Malaria Control Programme initiated in 1949, was converted to one of eradication in 1957. The programme is assisted by WHO, UNICEF and US/AID. For the purposes of the programme, the country was demarcated into four areas and the programme was to be so phased as to expand by one area each year. The operation was started in the northern sector including the provinces of Gilan, Mazanderan and West Azerbaijan. This was followed the next year by extension to the southern province and the following year to the central province. The programme in the northern sector covering a population of six million, is well advanced and has been under the consolidation phase for three years. Focal spraying has been found necessary in certain parts on account of imported labour. The central sector, even in spite of a multiplicity of problems, is in an advanced stage of attack phase. However, on account of the development of resistance in A. stephensi to DDT and later to dieldrin in the south and south-western sectors, the operations here have not progressed as rapidly as was expected. In this area, certain chemotherapeutic measures, including the use of medicated salt in specially selected parts, has been adopted in preference to spraying operations. As the population involved is about three million, this is a formidable problem. The other difficulty which the country is facing in this area is the problem of moving population.

Epidemiologically, the country may be divided into three zones: the Caspian, Central and Southern, including the alluvial plains of Khuzistan. In the Caspian zone the vector is A. maculipennis. Malaria is homogeneously unstable in this region, having an epidemic cycle at five to six year intervals. In the second region, the disease is unstable and in certain parts it is meso-endemic. The vectors are A. superpictus and in certain parts A. sacharovi. In the southern part the main vectors are A. stephensi and A. culicifacies, and the transmission season is usually long. Besides high endemicity in certain parts, the area is subject to periodic epidemics. Along the Zagros range A. fluviatilis in combination with the Palearctic vectors maintain an intermediate state of malaria.

According to the present plan, emphasis is being placed on completion of eradication activities in the northern sector within the next few years.

The border problems are insignificant in areas adjacent to Afghanistan and Pakistan. Effective co-ordination in malaria eradication activities along Iran/Iraq borders exists through a bilateral agreement between the two countries.

2.1.5 Pakistan

Pre-eradication surveys were conducted in each of the two provinces with the help of two WHO teams in 1960. In West Pakistan malaria is widely prevalent with the highest incidence in the former province of Punjab where both P. vivax and P. falciparum are prevalent. Parasite rates range from 20 per cent. to 60 per cent. in some areas, particularly along the Indian border. In the former province of Sind the parasite rates range from 10 per cent. to 30 per cent. In the northern region along the north-west frontier and in Baluchistan, malaria is hypo-endemic. The vector in the plains is A. culicifacies, whereas in the foot-hills it is A. fluviatilis. In some parts, A. stephensi has been suspected as a vector.

In East Pakistan, malaria is prevalent in the dry elevated parts and is of relatively minor importance in low-lying flooded districts. The disease is hyper- or meso-endemic in the north-west and hypo-endemic in the central part of the province.

There is a high incidence of malaria in the south-east. In most parts of the province, A. philippinensis and A. sondaicus are the vectors and malaria in these areas is unstable. In hilly areas A. minimus is the vector and here malaria reaches a condition of stability. All the three parasites, P. vivax, P. falciparum and P. malariae are encountered, though the former two species are more common.

A detailed plan of action has been drawn up and the Government has undertaken to implement it. It is a staged programme extending over a period of 14 years with the expenditure of Rs 520 million (US\$ 109 316 797) out of which Rs 193 737 032 (US\$ 40 786 743) represents external expenditure. The whole country, with a population of 90 million, is planned to come under attack phase by 1967. The operations are planned to commence from border areas with high endemicity and to extend inwards.

The plan is being implemented by an autonomous Malaria Eradication Board presided over by the Minister of Health. The Board is vested with complete financial and administrative autonomy and has its own financial regulations and service rules. All personnel in the project are employees of this Board and are governed by its rules and regulations. Two provincial subsidiary boards have been formed, responsible for execution of the scheme in the two provinces. Legislation has been enacted to give the autonomous character to the Malaria Eradication Board and to give the Board powers to enforce malaria eradication measures.

West Pakistan, with 41 million population, has been divided into four regions and 35 zones (each zone having a population of roughly one million). East Pakistan, with 51 million population, has been divided into three regions and 31 zones. Each zone is an independent operational unit.

In 1961 operations were conducted to protect over one million population in West Pakistan and over 370 000 population in East Pakistan. These areas are in the border districts of Sheikhpura in West Pakistan and Dinajpur in East Pakistan. During 1962 2.5 million population in West Pakistan and 1.7 million in East Pakistan will be protected mostly in the districts lying along the Indian border.

2.1.6 Syria

Syria has boundaries with Turkey, Iraq, Jordan, Israel and Lebanon. The frontier with Turkey in the north extends over 808 km. The total number of villages in the area involved is 3362, of which 1431 are at risk. Three hundred and seventy-one of these are under attack phase, while 1060 have entered the consolidation phase. The boundary with Iraq in the east and south-east is over 608 km. Only in the northern-most area did malaria pose any problem. A total of 174 villages are involved in this region and of these 117 are in the attack phase, while 57 are under consolidation. The frontiers with Jordan extend for about 352 km. Out of 179 villages in this sector, 145 are at risk. Seventy-eight of these are in the attack phase, while 67 are in the consolidation phase. The number of villages at risk in the Palestine border area is 237, of which 162 are in the attack phase, while 75 are in the consolidation phase. In the Lebanon border area there are 561 villages along a length of 278 km. Of these 513 are under the programme - 183 in the attack and 330 in the consolidation stage.

The main emphasis is being laid on a network of detection posts under the surveillance operation. These posts are being run through voluntary collaborators and 2014 collaborators were assisting the programme by the end of 1961. There were 685 medical staff who co-operated at different levels. Altogether 77 positive cases were detected in Syria in 1961. Of these 19 were from border areas, and 17 of these were of indigenous origin, one was imported and the other was a case of relapse. Of the 58 others in the rest of the country, 16 were of indigenous origin, 26 imported two relapse cases and 15 unclassified. Active case detection was not sufficiently established and therefore the main emphasis has been laid on passive detection.

As to the merits of active and passive case detection, it was generally agreed that, depending on local conditions, both were necessary. One should complement the other. Active detection is extremely important, in many parts, especially in less developed areas. At the same time, passive detection through the rural health centre and, where possible, through voluntary collaborators, is very helpful.

2.1.7 Turkey

The malaria eradication programme was initiated in 1957, supported by UNICEF and WHO. From the beginning, in view of the epidemiological findings, half the country was placed under consolidation and in this half, spraying operations were restricted to foci only. Total coverage was carried out in the rest of the country. Active case detection procedures were planned from the beginning in all malarious and potentially malarious areas. During 1961, 2479 blood films were found positive out of 1.98 million examined (0.12 per cent.).

The country has common borders with Bulgaria, Greece, Iran, Iraq, Syria and the USSR. No imported cases have been detected from these countries during the past two years. While the possibility of imported cases exists, the problem is not considered to be serious. As there was little traffic between the USSR, Bulgaria and Turkey, no special measures were adopted, there has been an agreement from 1955 between Turkey and Greece for joint operations along the common frontier. As there are high mountains between Turkey and Iran, movement of population is restricted, both spraying operations and active case detection operations are in progress in these parts. However, the picture is different along the frontier with Iraq on account of the movement of nomads. Active detection here was planned to be initiated from 1962. There is no special problem in the frontier area bordering Syria.

Turkey intends to retain a central malaria service in the Department of Preventive Medicine of the Ministry of Health.

2.1.8 The USSR

In most parts of the country malaria has been eradicated. There were very many parts where no malaria cases have been detected for several years. The total number of cases reported in 1961 was 498, of which only 176 were from areas bordering neighbouring countries, the greatest number being from areas adjacent to the USSR/Afghanistan border. Mass blood survey carried out in 1961 showed 138 positive cases out of five million smears examined. Investigation proved that most of the cases were imported.

Ever since 1920 malaria control measures in the USSR combined measures for detection, registration and treatment of malaria patients. Rural medical institutions participate in this programme by carrying out surveys of the population for treatment of all malaria patients detected and their follow up. All rural hospitals are fully equipped with laboratories which carry out blood analysis for all fever cases, malaria and otherwise. One hundred per cent. hospitalization of all detected malaria patients is available for the whole period of treatment. In spite of the fact that in 1960, 401 612 physicians and 1 388 300 paramedical personnel were enlisted for malaria control work, it is planned to develop the rural public health network even further and equip them with fully and highly qualified physicians in all fields.

2.2 Role of Inter-Governmental Malaria Co-ordination Committees (Agenda item 5)

The importance of co-ordinating malaria eradication activities along both sides of international borders is well appreciated by most countries engaged in the task of malaria eradication. Two conferences had been held between Iraq and Iran, the first in October 1961 and the second in March 1962. These meetings helped considerably in the exchange of information on the activities in each of the countries with particular reference to border areas. Having reviewed the programme on both sides and realizing the necessity of frequent contacts, the two countries had decided (a) to arrange such meetings every six months, (b) in urgent cases direct contacts were to be established between the local border representatives. The meetings also stressed the urgency of detailed entomological studies, especially in areas where A. stephensi had developed resistance. Further, it was appreciated by representatives of both countries that besides intensification of active surveillance operations, due importance was to be attached to case detection through health units, voluntary collaborators, private practitioners, etc. Several special investigations were also to be undertaken.

There had been three inter-country border meetings between India and Burma, the first one being held in 1957, even prior to the commencement of the malaria eradication programme in India. Similar meetings were held twice between India, Burma and Pakistan. These meetings provided ample opportunities to the representatives of the respective governments to obtain a knowledge of the activities under the programme in each country.

In these meetings, valuable information could be exchanged about the problems in border areas and the manner in which they were to be solved. All countries are preparing detailed border maps up to a depth of 20 miles and these will be sent to the World Health Organization by the respective governments. One of the positive results of these contacts has been the synchronization of spray operations on both sides of the border. As an illustration, it was mentioned that India had modified the pattern of activities in the Indo-Burma border so that the operations in this area were in conformity with those in the Burma border area. Similar synchronization of activities had been considered during the last meeting between India and Pakistan. The meetings also considered the question of direct exchange of technical information between the programme directors in the three countries, particularly relating to urgent matters requiring prompt attention. Annual reports are being exchanged.

Another border meeting was held between India and Nepal in 1961 and the second one is due in 1962.

In connexion with direct contacts between workers on both sides of the border, the possibility of meetings at customs posts was considered. It was reported that no difficulties were experienced by the workers in India and Burma in the border area in effecting frequent contacts for the exchange of information and co-ordination of operations. As to operations in the Indo-Pakistan border areas, particularly in respect of large enclaves, concrete proposals had been submitted to the respective governments based on the recommendation of the border conference.

A co-ordinated plan for malaria eradication in continental Europe was presented, and the advantages of having such a plan endorsed by the respective regional committees were mentioned. Such a plan should apply to a large geographical area, as homogeneous as possible in terms of epidemiological conditions, social and economic development, stage of advancement of malaria eradication programmes, geographic, cultural and administrative patterns. In addition to a detailed evaluation of the epidemiological situation existing in each country participating in the plan, together with details of staffing, financing, supporting legislation and organization of the individual eradication programmes, including international or bilateral assistance, the following main items should constitute the basis of the plan of action: an agreement on the standardization of the operational methods, and on the methodology to be employed for

the co-ordination and co-operation of the individual programmes, a calendar with detailed forecasts of the time when the various phases of the eradication programme will be reached in each country or group of countries; and, details of the method of assessment and evaluation of the plan during its operation, including the role that will be assumed by WHO in this respect, particularly as far as the final evaluation of achieved eradication is concerned.

2.3 Geographical Reconnaissance and its Importance in both Attack and Consolidation Phases (Agenda item 2)

Various practical difficulties and problems are encountered in the absence of proper geographical reconnaissance, as for instance, when unsprayed villages are detected in the operational areas or when foci of persistent transmission need to be clearly demarcated so that remedial measures may be taken. Such difficulties could have been avoided if geographical reconnaissance had been undertaken in the preparator phase of the eradication programme as well as at periodic intervals subsequently. In Iran, in areas under attack, where no geographical reconnaissance had been previous carried out, such action is now undertaken every year using surveillance staff during the winter for a period of two months.

The various activities to be undertaken in making a geographical reconnaissance include the preparation of maps of villages, numbering of the houses, provision of house cards, etc. The possible routes taken by nomadic tribes or mass transhumance should also be shown on maps.

The value of geographical reconnaissance in any rural health activity was stressed and it was felt that the subject should be included in the syllabi for the training of all public health officers, visiting nurses and sanitarians who are engaged in rural health programmes.

As to the various modifications and simplifications of the procedure, each country should formulate its own plan, taking local factors into consideration.

2.4 Technical and Operational Problems

2.4.1 Nomadism and other operational difficulties

(a) Nomadism

It was appreciated by some countries that nomadism and other population movements pose a serious challenge to the early success of malaria eradication. However, many of these operational problems are common to all countries and have to be solved as and when they arise. But the nomadic problem differs in every country in that little is known regarding its implications in country-wide malaria eradication programmes. It was emphasized that further studies should be carried out in each country in order to assess the problem, and recommend the appropriate measures to deal with it.

In Iran an attempt is being made to solve many of the aspects of the problem of nomadism by the use of medicated salt. In view of the difficulties experienced by the tribal people to procure salt from distant places, they readily accept the medicated salt which is supplied free. In pilot projects amongst a group of nomads using medicated salt no positive cases were found for a year and a half, as against a comparison group not using medicated salt where there were many positive cases. As to spraying operations, it seems that at least three rounds have to be applied in order to be effective, but the results have to be further assessed. In view of the nature of the surface to be treated, a sticking agent is incorporated into the insecticide formulation.

Experience in Sudan indicated that a study of the movement pattern of the nomads is often helpful. The problem of moving population is quite considerable in the Afghanistan and Pakistan frontiers. About 0.5 million nomads move out of Afghanistan every year and pass through Pakistan. As this movement to Pakistan takes place over a very limited time, the question of dealing with such a large number of moving population should be taken up at an early date by both countries.

It was mentioned that certain countries confronted with large nomadic problems may ask WHO for assistance in carrying out the necessary studies as part of the WHO research programme.

(b) General operational difficulties

In the discussion on the problems related to operational factors, it was generally agreed that communication difficulties should not be allowed to stand in the way of an eradication programme. It is true that the programme would be slowed up in areas with a lack of communication facilities as compared to areas where adequate facilities exist. In view of this, it is necessary that suitable staff provision be made to meet the work-load both in respect of spraying and surveillance operations. It is also necessary to plan ahead for contingencies such as floods, etc. An adequate supply of insecticide is a primary necessity; it is most essential that the material should reach the periphery in time for the spraying operations to be commenced according to the time schedule. The spraying programme has to be timed in accordance with the results of epidemiological investigations so that it will be initiated and completed before the malaria transmission season. Resistance from the people to accept spraying operations on account of a number of factors may militate against total coverage. However, it is the general experience that most of these problems can be solved by a suitable approach not only by special health education staff but by the personnel of the malaria organization. In recent years an increase in bed-bugs has been associated in people's minds with insecticide spraying operations. While it was true that in some areas bed-bugs had actually developed resistance to insecticides, it was also true that in many areas insecticide application had been refused over a number of years as the people noticed that it is no longer giving them the same relief from other nuisance insects as they used to enjoy earlier. According to some observers, the problem of bed-bugs was more associated with poor spraying than with the application of a heavy dose. There was no doubt that the spraying and surveillance staff were the most obvious personnel to disseminate adequate knowledge to the beneficiaries of the programme.

2.4.2 Asymptomatic malaria cases and their detection

The existence of positive cases without symptoms such as fever has been reported by a number of workers. Since surveillance operations are based primarily on the collection of blood smears from fever cases for the detection of malaria parasites, asymptomatic cases will escape detection. However, since asymptomatic cases were

generally due to old infections and as the establishment of transmission through such cases alone was uncommon, asymptomatic cases were unlikely to pose a serious challenge to the early success of the operation. In this connexion it was mentioned that asymptomatic cases usually arise from lack of total coverage of the spraying operations during the attack phase. However, some observers thought that the genesis of these cases should be further studied. In any case it would be possible to detect the secondary cases from asymptomatic patients as they would be likely to show symptoms. It was also believed in many quarters that very thorough and systematic inquiries may reveal a fair number of cases with very mild symptoms. In this connexion, it has been suggested that the greater the frequency of visits of the surveillance workers, the more reliable would be the data as any symptoms, even comparatively mild ones, would be remembered more easily.

2.4.3 Radical cure of malaria and operational difficulties

A review of the pattern of radical treatment followed in the different countries furnished the following information regarding the adult dosage schedule.

(a) Jordan

For P. vivax and P. malariae

1st day	Chloroquine - 600 mg Primaquine - 15 mg
2nd and 3rd days	Chloroquine - 300 mg Primaquine - 15 mg
4th to 14th days	Primaquine - 15 mg

(b) Iran

For P. falciparum

1500 mg chloroquine administered in 3 daily doses of 900, 300 and 300 mg along with 45 mg primaquine.

For P. vivax and P. malariae
(under hospital conditions)

1st day	Chloroquine - 600 mg Primaquine - 15 mg
2-14 days	Primaquine - 15 mg

For P. vivax and P. malariae
(under field conditions)

1st day - Chloroquine 600 mg
Primaquine 45 mg

followed by 45 mg primaquine and 300 mg chloroquine weekly for eight weeks. In addition each positive case is given 45 mg primaquine weekly plus 600 mg chloroquine weekly for four weeks as anti-relapse treatment in the subsequent year.

(c) India

The regime is the same for all three parasites.

1st day	Chloroquine - 600 mg Primaquine - 15 mg
2nd to 5th days	Primaquine - 15 mg

(d) Iraq

The pattern is the same as in Iran.

Sensitivity tests to primaquine carried out in Iran had shown that the proportion of sensitivity was high amongst the tribal population while being low amongst the rest.

In the dosage schedule followed, no serious toxic manifestations or adverse side effects had been reported by any of the countries.

With regard to difficulties encountered during the administration of the drug, it was reported that quite often co-operation was lacking particularly from people who were afebrile. Some difficulties were also experienced in treating small children and women. It was the general experience that, while a 14-day regimen with primaquine had proved highly effective, the administration of the drug for 14 days often posed serious problems. When admitted to hospital it meant loss of wages for the workers who prefer to go back to work. It was noted that in Venezuela hospital patients were compensated for loss of wages. In the field, a much larger number of people would be required to administer the drug than normally provided at present. Thus, the cost of administration would be high if the 14-day regimen were followed. On the other hand, the cost would be less with a weekly regimen, though occasionally it was difficult to trace the case after a few doses. Operationally the regimen adopted in India and the machinery provided to administer the drug seemed to be adequate under conditions in that country and met the difficulties referred to earlier.

It was however felt that close observation and systematic follow-up of positive cases were necessary. In some countries in the European Region, all cases treated radically were given similar treatment in the two following years as well.

2.4.4 Entomological factors in persistent malaria transmission

In reviewing the problems related to the persistence of malaria transmission due to entomological factors, the consensus of opinion was that the bionomics of the vector species played an important role. Studies on the house-haunting and resting habits and man-biting behaviour should be made during the pre-spraying period wherever possible to serve as baseline data for comparison of studies undertaken, as well as after mass house-spraying campaign to detect any changes in vectors' behaviour and habits induced by the insecticide and their significance in interpreting persistent malaria transmission.

While anopheline vectors can be considered as exophagous or endophagous, this classification is actually linked with man's habits of resting indoors or out of doors during the vectors' biting. Exophagic behaviour coupled with exophilic tendency, natural or induced (due to irritability to insecticide residues) may partly or totally spoil the protection rendered by the spraying operation.

In connexion with the question of vector resistance to insecticides, it was emphasized that it was of primary importance to ensure beforehand that the domiciliary spraying campaign is well executed (as regards timing, total coverage, and adequate dosage of insecticide). Any indication detected as to the persistence of transmission due to an incipient or intermediate resistance to insecticide on the part of local vectors may necessitate the introduction of supplementary antimalaria measures during the attack phase with a view to shortening its period so that it may be completed before full resistance to the insecticide appears.

In reviewing existing entomological techniques in detecting the possible factors responsible for non-interruption of transmission in spite of adequate spray coverage, a need was felt to develop more practical and easy methods for routine entomological evaluation of the degree of contact between the vector species and sprayed surfaces and between the vector and man. The methodology now employed for man-biting rate observation, for example, on account of its tedious nature and the inconsistency of data yielded (due to non-uniformity of sampling techniques and other human factors) was used on a very limited scale by most of the participating countries.

2.4.5 The problem of human resistance

The human factor, producing operational problems, has been recognized by all countries. Most of these problems relate to habits, customs, religious beliefs, etc., as well as to ignorance about the programme. In some countries, entry to houses either for spraying or surveillance operations poses some problems on account of local customs. However, they have to be surmounted by contact with the local people which is a prerequisite for an operation of this nature. In some areas, the employment of women surveillance staff solved much of the difficulty. It was generally felt that health education activities and training of surveillance staff to deal with the local people in the proper manner would go a long way to solving the various problems. Contacts with local leaders and assistance through these agencies would be extremely helpful. Above all, it was essential that there be constant contact with the people and that every staff member of the Malaria Eradication Service should know that he has an obligation to disseminate health education to that part of the community with which he comes into contact from the highest to the lowest level.

2.5 The Role of the Rural Health Services in the Various Phases of the Malaria Eradication Programme (Agenda item 4)

Several countries have reached an advanced stage in their malaria eradication programmes and realize the urgent need for adequate health services to meet the requirements of the programme during the maintenance phase. Moreover, health service facilities, such as rural health centres, could play a very important role in passive case detection operations both in the late attack and consolidation phases. Some countries are already utilizing the services of these centres for this purpose. They would be of particular value in problem areas. Where necessary, the national malaria eradication services are assisting these centres by providing staff for the collection of blood smears from fever cases and also by extending facilities for microscopic examination of these smears. However, at the end of the consolidation phase, the position would be changed considerably as the Malaria Eradication Organization in its present form would cease to exist. Obviously the principal activities in the maintenance phase such as vigilance operations, will be taken over by the general health services, particularly by the rural health services of the country.

After a review of the health service development plan in various countries and the extent of coverage of the population envisaged at different periods, the conference was of the opinion that the development of the basic rural health services on a total coverage basis was of the greatest importance for the success of malaria eradication programmes. Such health services should be adequately staffed to undertake the necessary activities required under the eradication programme during different phases of the programme. Where possible, the basic health services should be introduced into the over-all planning of the Malaria Eradication Programme at the earliest stage possible as an integral part of the plan of operation. In those countries where the eradication programme has reached an advanced stage and yet where the rural health services are not adequately or appropriately staffed or well distributed on a total coverage basis to cater for the basic health needs of the country, the governments must expedite action to build up such rural health services and accord the necessary priority to those areas where the programme has reached a very advanced stage. Since, in the absence of adequate basic health services, the programme cannot enter into the maintenance phase, the need for prolonging the consolidation phase and the cost involved should be fully appreciated in all quarters. The governments of the various countries should take this situation into consideration and therefore take prompt action for the early establishment of the health services where they do not exist.

2.6 The Mechanism of Gradual Integration of the Staff and Functions of the Malaria Eradication Service with the Public Health and Environmental Sanitation Service (Agenda item 6)

Large-scale malaria eradication activities had been initiated in some countries where basic health services have not been developed, in other countries malaria eradication activities are in progress pari passu the development of health services in various stages, and there were also countries where the general health services are well organized, and the malaria eradication operation is an integral part of the health services.

In some countries, the malaria eradication organization has been built up at enormous cost over a period of many years. Large numbers of technical and sub-professional staff have been recruited and trained, and these personnel have gained considerable experience, some in field duties, domiciliary health visits, health education, others in laboratory services, epidemiological studies, etc. As long as the malaria eradication programme continues, i.e. up to the end of the consolidation phase, their services would be indispensable to that programme. At the same time,

the Conference realized the necessity of utilizing the services of such trained personnel for the development and expansion of various other public health activities of importance. There are a number of developing countries where there is an urgent need for the improvement of environmental sanitation besides control of various communicable diseases, such as schistosomiasis, ancylostomiasis, trachoma, onchocerciasis and trypanosomiasis. There are also areas where, after the withdrawal of spraying operations under the eradication programme, many collateral benefits like the control of plague, leishmaniasis, etc., now enjoyed would be withdrawn. Attention would need to be directed to these fields.

Having considered all the various aspects, the Conference was of the opinion that the government of each country should give the necessary importance to the gradual integration of the experienced staff of the malaria eradication programme when entering the maintenance phase, into the general health services and could also, where necessary, utilize some in special health programmes which may be initiated.

For this purpose, a co-ordinating executive committee in the Ministry of Health should be formed to devise the mechanism and guide the progress of the above integration. All countries should accord high priority to this aspect in order to plan ahead for the utilization to the maximum of the services of all public health workers engaged in malaria eradication programmes in other health and environmental sanitation activities.

2.7 Training of Personnel in Malaria Eradication Projects (Agenda item 7)

A committee responsible for the detailed planning of various training activities and schedules should be developed in each country and should be responsible for determining the training needs of the various categories of personnel in the country. The training programme should be so scheduled as to be able to meet the demands of the programme at the different phases. Budgetary provisions, teaching staff for training centres, equipment and supplies needed, office accommodation for the staff and hostels for the students as well as facilities for field training in areas preferably close to the centre should all be planned for by the committee. As mentioned in the Sixth Report of the Expert Committee on Malaria

"The recruitment and training of personnel ought to be carefully co-ordinated at all levels, to avoid loss of time and waste of money."

The committee should review the plan for training yearly in the light of experience gained and according to modifications that may be introduced to programme requirements of trained personnel.

The importance of selection of teaching staff for training in malaria eradication was stressed. Teaching staff should have wide field experience which will enable them to emphasize the practical aspects required for malaria eradication work. Training centres should basically be staffed with full-time teachers and assisting staff, in addition to part-time lecturers and instructors who could be assigned for short periods from the national malaria eradication service as well as from host institutions.

The importance of inter-country visits of teaching staff of national and regional centres to institutions of similar nature was mentioned. This could be supplemented by exchange of lecture notes, films, etc. The programme should envisage the training of both junior and senior categories of personnel and the curricula should include basic training, to be supplemented by reorientation and refresher courses as the programme advances. Provision should also exist for special training programmes for certain categories of personnel such as entomologists, those engaged in epidemiological investigations, sanitary engineers, microscopists, etc. It was also recommended that, as the programme reaches a fairly advanced stage (consolidation phase) in many countries, emphasis should be laid on more intensive and refined training in epidemiology. Attention needs to be focussed on problem areas particularly relating to persistent transmission.

There is a consensus of opinion that training future malaria eradication workers is a vital undertaking and should receive priority in planning and in assistance by WHO and bilateral agencies, wherever implementation of a malaria eradication programme is contemplated. WHO assistance in organizing and standardizing such training through study tours of national epidemiologists to countries having advanced phases of malaria eradication or to areas of epidemiological interest was discussed. Various suggestions as to the role of WHO in assisting and co-ordinating the activities of the malaria eradication training centres were made.

Co-ordination of the activities of national training centres is of the greatest importance and is at present either lacking or very limited. This co-ordination may be established through exchange of training information as mentioned above. Meetings between key personnel of training centres to exchange views and co-ordinate efforts could prove useful. Exchange of lecturers was also discussed as well as the training in public health activities of malaria personnel during the period when a programme approaches the maintenance phase.

The role of WHO in evaluating the work of each national training centre in order to assist and strengthen it, was also mentioned. This may be carried out by promoting technical and material assistance, reviewing of curricula and introducing improvements in training procedures with a view to standardizing basic requirements for a uniform training technique which can be guided by WHO. WHO could also circulate information on plans of each training centre. In addition to the above, the granting of WHO fellowships, exchange of lecturers and short-term consultants were mentioned.

3. RECOMMENDATIONS

3.1 Progress of Malaria Eradication with Particular Reference to Border Areas and Role of Inter-Governmental Malaria Co-ordination Committees (Agenda item 5)

The Inter-Regional Technical Meeting on Malaria Eradication,

Noting the progress reports on the malaria eradication programmes of Afghanistan, India, Iran, Iraq, Pakistan, Syrian Arab Republic, Turkey and the USSR,

Recognizing the inadequacy of the exchange of detailed epidemiological and operational information on malaria in frontier areas, especially when these areas are situated in countries belonging to different WHO regions,

Appreciating the value of developing a co-ordinated plan of operation for neighbouring countries, as developed in continental Europe,

RECOMMENDS that

(a) countries carrying out malaria eradication programmes progressively by stages speed up their programmes as much as possible and give priority to the implementation of activities in frontier areas, so as to minimize the risk of re-introduction of malaria into frontier areas of neighbouring countries which have already been freed from this disease,

- (b) neighbouring countries within a region establish border co-ordination committees to meet periodically in order to exchange information and recommend action to be taken along frontiers,
- (c) countries establishing the above-mentioned committees exchange maps of border areas showing location of border units, and exchange quarterly reports according to an agreed proforma showing epidemiological and entomological data, movements of population across frontiers and operational activities in a 10 km belt on either side of the frontier,
- (d) neighbouring countries within one region, which are advanced in their malaria eradication programmes, develop a co-ordinated plan to be submitted to the regional committee for endorsement, and suggests that WHO establish a protocol for the development of similar plans involving neighbouring countries belonging to two or more regions,
- (e) upon request of two neighbouring countries belonging to the same or different regions, WHO establish a malaria frontier inspection team composed of a WHO epidemiologist and one or two members from each of the two neighbouring countries to visit border problem areas, and to suggest action to be taken, and that, following the visit of this team, each country submit biannual progress reports to the respective regional office or offices on the implementation of the team's recommendations,
- (f) countries utilize as much as possible the services of WHO regional offices to stimulate co-ordination, and to offer facilities for exchange of information.

.2 Geographical Reconnaissance and its Importance in Both Attack and Consolidation Phases

The Inter-Regional Technical Meeting on Malaria Eradication,

Realizing the vital importance of geographical reconnaissance in both attack and consolidation phases of malaria eradication programmes,

Noting that this activity has to be maintained throughout both these phases in order to keep the records up to date,

(a) STRESSES that malaria eradication services should be aware that geographical reconnaissance is a prerequisite for effecting total coverage either in the spraying or surveillance operations without undertaking geographical reconnaissance and that no extension of such operations in stage-wise programmes can be made unless geographical reconnaissance has been completed,

(b) RECOMMENDS that, in countries where the attack phase was launched without undertaking geographical reconnaissance, activities meeting the objectives of geographical reconnaissance should be undertaken without further delay by spraying teams or by surveillance agents, and should include as far as possible routes taken by nomadic tribes or mass transhumance,

Recognizing that geographical reconnaissance as developed by malaria eradication workers forms an essential basis for any public health work,

(c) RECOMMENDS that this subject be included not only in the syllabus of every malaria eradication course, but also in the syllabi for training public health officers, home-visiting nurses and sanitarians employed in rural health units.

3.3 Technical and Operational Problems

The Inter-Regional Technical Meeting on Malaria Eradication

Presents its views and recommendations on the technical and operational problems encountered in the malaria eradication programmes of the participating countries, under the following sub-titles:

3.3.1 Nomadism

The Inter-Regional Technical Meeting on Malaria Eradication,

Recognizing the importance of technical and operational problems due to nomadism and the difficulty of their solution,

Appreciating the studies performed in some of the participating countries and the valuable contribution they have made to the epidemiology of malaria related to nomadism,

Recognizing the value of the attempts made for the eradication of malaria amongst nomads in Iran by means of insecticidal treatment of tents during the transhumance and of the use of medicated salt where circumstances favoured its acceptance,

Noting that the problems of nomadism differ in every country and that much more needs to be known before effective methods for the eradication of malaria among nomads can be developed and the danger of the re-introduction of malaria by them can be eliminated,

RECOMMENDS that

- (a) the governments concerned undertake further studies to determine the areas affected by nomadic movements and their epidemiological implications, setting up, where necessary, pilot projects for the testing of appropriate methods,
- (b) WHO provide or co-ordinate such technical and material support as may be required.

3.3.2 Asymptomatic malaria cases

The Inter-Regional Technical Meeting on Malaria Eradication,

Recognizing that asymptomatic malaria cases can only be detected through mass blood surveys (through the appearance of symptomatic secondary cases) or through epidemiological investigations carried out on symptomatic secondary cases in a locality where a positive case has been found,

Noting that the occurrence of asymptomatic as well as symptomatic cases is often associated with imperfect spraying operations or with incomplete radical treatment,

Noting that more knowledge is required as to the role of asymptomatic malaria cases in the persistence or resumption of malaria transmission,

RECOMMENDS that

- (a) national malaria eradication services ensure adequate spraying operations and radical treatment of cases in the appropriate phases of the programme, and
- (b) further studies be undertaken on the genesis of asymptomatic malaria cases and their importance in the epidemiology of disappearing malaria.

3.3.3 Radical cure of vivax and malariae infections

The Inter-Regional Technical Meeting on Malaria Eradication,

Noting that the 14-day primaquine regime following the 3-day chloroquine course is the one which has been found most effective for the radical cure of P. vivax and P. malariae infections, but that its administration meets with a number of operational difficulties,

Noting that in order to reduce the above difficulties certain of the participating countries have adopted other primaquine regimes, some giving it over five days, and others on a weekly basis over eight weeks, and that both regimes appear promising though as yet insufficiently evaluated,

Recognizing that in the dosage schedules followed by participating countries no serious toxic manifestations or adverse side effects have been reported,

Noting also that there are certain advantages in repeating the primaquine course to all confirmed malaria cases once again in the pre-transmission period of the year subsequent to its initial discovery and treatment,

RECOMMENDS that

- (a) primaquine regimes at present in use be scientifically evaluated as to the relapse rate over one or more years following their administration, and as to the ability of reappearing parasites to infect malaria vectors,
- (b) further studies be stimulated and supported by WHO with a view to developing radical treatment regimes of primaquine or other drugs of easier application, and
- (c) wherever feasible a second primaquine course be routinely given in the pre-transmission season of the year subsequent to the discovery and initial radical cure of every confirmed vivax or malariae infection.

3.3.4 Entomological factors in persistent malaria transmission

The Inter-Regional Technical Meeting on Malaria Eradication,

Recognizing that, in the absence of operational failures, there are cases where the habits of man or the adverse response of the vector to the insecticide, hinder the achievement of malaria eradication through standard methods,

RECOMMENDS that

- (a) malaria workers should thoroughly exclude any operational failure when recommending entomological or other investigations to find out the cause or causes of persistent malaria transmission, and
- (b) appropriate entomological studies on behaviour of the vector, its contact with man, and its response to the insecticidal applications be stimulated with a view to indicating the appropriate alternative measures to be applied to stamp out any residual foci of persistent malaria transmission.

3.3.5 Human resistance

The Inter-Regional Technical Meeting on Malaria Eradication,

Recognizing that human resistance is encountered at all levels, particularly in the later stages of a malaria eradication programme,

Realizing that this resistance is chiefly due to inadequate information of the public, the medical profession, legislators and governing bodies as to the objectives and benefits of this extensive public health undertaking, and to inadequate preparation of the different social strata of the community to accept and support it,

RECOMMENDS that

- (a) tactics and procedures of health education should be developed to suit every social stratum with a view to obtaining its maximum support and participation in the malaria eradication programme, and
- (b) particular attention be devoted to the health education functions which each member of the staff of the malaria eradication service has to perform in relation to that part of the community with which he comes into contact from the highest to the lowest level.

3.4 The Role of the Rural Health Services in the Various Phases of the Malaria Eradication Programme

The Inter-Regional Technical Meeting on Malaria Eradication,

Noting that the malaria eradication programmes in most of the participating countries are advancing towards the final stages of the consolidation phase,

Realizing the utmost importance of an adequate basic health service in all areas covered by the malaria eradication programme for the successful achievement and maintenance of eradication,

Recognizing that, in the absence of adequate basic health services to sustain malaria eradication, it would be necessary to prolong the consolidation phase until such time as the basic health services are able to take over the functions necessary for the prevention of re-establishment of malaria,

RECOMMENDS that the governments concerned review their plans for the development of basic health services and take prompt measures for the speedy establishment of such services, giving priority to areas approaching the maintenance phase and to problem areas where the existence and full participation of such services would facilitate the progress of eradication in the attack phase.

3.5 The Mechanism of Gradual Assumption of New Functions under the Health Services by the Staff of the National Malaria Eradication Programme

3.5.1 The Inter-Regional Technical Meeting on Malaria Eradication,

Having examined the staffing of malaria eradication services in the participating countries,

Noting the needs of the expanding health programmes and the paucity of personnel with the experience and outlook required for rural health activities,

Recognizing the value of the experience gained by the personnel of the malaria eradication programmes and the desirability of utilizing their experience in general health services, particularly in mass campaigns and in environmental health activities, and

Realizing the need during the maintenance phase for personnel at all levels of health services who are familiar with malaria eradication procedures,

RECOMMENDS that committees be set up at national level with appropriate public health authorities and the director of the national malaria eradication programme to formulate detailed plans for the integration of the malaria eradication personnel into the general health services.

.5.2 The Inter-Regional Technical Meeting on Malaria Eradication,

Having examined the needs of the participating countries for the maintenance of eradication after the end of the consolidation phase,

Recognizing the need for adequate epidemiological vigilance of the malaria situation in the country for taking prompt and effective measures to prevent the re-establishment of endemicity,

RECOMMENDS that

(a) during the consolidation phase, the general epidemiological services of the department of health should actively collaborate with the national malaria eradication directorate and participate in the epidemiological evaluation of the programme, and

(b) appropriate action be taken to augment existing epidemiological sections at national level and set up at appropriate levels epidemiological units including personnel trained in malaria epidemiology for providing the necessary guidance for taking measures directed against the re-establishment of malaria endemicity.

.6 Training of Personnel in Malaria Eradication Projects (Agenda item 7)

The Inter-Regional Technical Meeting on Malaria Eradication,

Noting the importance given to training in malaria eradication by the countries represented;

Recognizing that training activities are an integral part of any malaria eradication programme and must be subservient to its needs, and

Believing that the National Malaria Eradication Training Centres should be strengthened,

RECOMMENDS that

- (a) A committee be formed at national level whose functions will be
 - (1) to determine in advance the numbers to be trained in each category of personnel, the educational background required of the trainees, rules of selection of candidates for local training or for training abroad, the courses to be given every year and their schedules in accordance with international standards and in close reference to the projected operational requirements,
 - (11) to plan the training activities by providing adequate budgetary provision for permanent staff, teaching allowances, equipment, supplies and transport, and by providing lecture halls, and laboratories to accommodate a maximum of 30 students per course, as well as a field training area preferably near the training centre.
- (b) Sufficient staff be made available at the national training centres covering the several specialities of malaria eradication, having adequate practical experience of malaria eradication and being fully conversant with the standards and procedures followed at international malaria eradication training centres and where necessary, advisory teaching personnel be provided by the World Health Organization, or by appropriate bilateral agencies.
- (c) Provision be made for the teaching staff of national and regional centres to visit institutions of a similar nature in other countries and exchange of lecture notes, films and other training aids, be stimulated.
- (d) Curricula for both junior and senior courses include basic training on malaria eradication for all class members, followed where appropriate by a division of the class for training in specialized activities.
- (e) Training be recognized as a continuous process for all personnel throughout the malaria eradication programme and be effected not only through standard basic training courses but also through re-training, refresher, and special courses, as well as through seminars, meetings for exchange of information, and through distribution of information circulars and scientific documents.

(f) Translation of WHO manuals and documents be provided, wherever necessary, by the training centres for the benefit of students.

(g) Increased training in epidemiology be given as the malaria eradication programme advances towards the consolidation phase, WHO assisting in organizing and standardizing such training, and in providing facilities for study tours of national epidemiologists to countries in advanced phases of eradication or to areas of special epidemiological interest.

(h) Courses include the preparation of personnel for other public health activities especially in training oriented toward late consolidation and maintenance.

(i) Co-ordination of training activities between national malaria eradication training centres and other public health training institutions be maintained at all phases of malaria eradication programmes, teaching being given in the early phase of the programme by the staff of the malaria eradication training centre to the students in the other institutions, and as the malaria eradication programme approaches the maintenance phase, the staff of these institutions giving training in other public health activities to malaria personnel.

(j) WHO be requested to organize advanced specialized courses at appropriate regional or national malaria eradication training centres, for senior personnel in malaria eradication programmes as well as for teaching staff of malaria eradication training centres.

(k) In order that the availability of training facilities may be made widely known, WHO regional offices be notified in advance by the national training centres, of the courses planned for the year, giving details as to the type of course, curriculum, dates, teaching language, capacity of the course, and number of places available for fellows from other countries.

4. AGENDA

1. Progress reports on malaria eradication in each country with a stress on the measures taken against frontier malaria problems
2. Review of geographical reconnaissance techniques and importance in both attack and consolidation phases
3. Technical and operational problems and recommendations to tackle them
 - 3.1 Nomadism and the operational difficulties related to it, other difficulties experienced in maintaining total coverage due to factors related to physical environment or human customs and habits
 - 3.2 Asymptomatic malaria cases - comparative evaluation of case detection methods
 - 3.3 Radical cure of malaria and operational difficulties in implementation
 - 3.4 Persistent malaria transmission due to operational and entomological factors and methods to be recommended
 - 3.5 Human resistance - practical and effective health education techniques to be applied for the promotion of a malaria eradication programme
4. The role of the rural health services in the various phases of the malaria eradication programme
 - 4.1 Patterns of health services provided to rural communities, contributing organizations, plans for future development (reports on each country)
 - 4.2 The evolution of public health activities in a rural health unit and its staffing
 - 4.3 Role of the rural health unit in the various phases of an eradication programme
 - 4.4 Organizational pattern and increased staffing necessary to assure efficient functioning and co-ordination of the rural health unit and the malaria eradication programme during the attack and consolidation phases, and later in the maintenance phase - need for this to be covered in planops and addenda to planops
 - 4.5 Policy of priority for malaria eradication in rural health activities when a malaria eradication programme is under way - regulations required

Role of inter-governmental malaria co-ordination committees

- 5.1 Report on Iran/Iraq malaria co-ordination activities
- 5.2 Report on India/Burma/Pakistan malaria co-ordination activities
- 5.3 Review of the recommendations and the mechanism for effecting inter-country co-ordination with a view to the ultimate development of a sub-regional co-ordinated plan for malaria eradication

The mechanism of gradual integration of the staff and functions of the malaria eradication service with the public health and environmental sanitation service

- 6.1 The need for developing a co-ordinating executive committee in the Ministry of Health for integrating the national malaria eradication staff with the public health service (members, functions and terms of reference)
- 6.2 The establishment of an assessment team attached to the malaria eradication board for the technical auditing of the activities during the consolidation phase
- 6.3 The development of a central malaria eradication epidemiological unit in the Department of Preventive Medicine of the Ministry of Health (members, functions, and terms of reference)
- 6.4 Review of the quarantine measures recommended to prevent re-introduction of malaria to areas in the maintenance phase

Training of personnel in malaria eradication projects

- 7.1 Means to strengthen the national malaria eradication training centres - co-ordination activities between these centres and exchange of fellowships, and acceptance of fellowships from neighbouring countries
- 7.2 The need for increasing the training in epidemiology for the existing professional staff as the malaria eradication programme advances towards the consolidation phase
- 7.3 Co-ordination of training activities between malaria eradication training centres and other institutions in the field of health and sanitation as the programme advances

5. LIST OF PARTICIPANTS

Afghanistan	Dr Abdul Qadeer, Vice-President, Malaria Institute, Kabul
India	Dr A. P. Ray, Director, National Malaria Eradication Programme Delhi (Rapporteur)
Iran	Dr P. A. Khabir, Director-General, Department of Environmental Health and Malaria, Teheran (Chairman)
	Dr Ch. Mofidi, Director, Institute of Parasitology and Malariology, Teheran
Iraq	Dr Shakir Tawfiq, Chief Medical Officer, Basrah Liwa, Basrah
	Dr Tarik Amin, Director, Malaria Eradication Service, Baghdad
Pakistan	Lt. Col. M. K. Q. Hashmi, Director, Malaria Eradication Programme, Karachi
	Lt. Col. S. A. Mallick, Deputy Director, Health Services, Dacca
Syrian Arab Republic	Dr A. Budeir, Director, Malaria Eradication Service, Damascus
Turkey	Dr C. Goekberk, Director, Malaria Institute of Adana, Adana (Vice-Chairman)
USSR	Professor S. N. Pokrovsky, Director, Institute of Medical Parasitology, Rostov-on-Don, RSFSR
<u>Other participants</u>	
Eng. A. H. Alami	Chief, Division of Malaria Operations, Department of Environmental Health, Teheran
Dr H. Basseghi	Chief, Health Department, Plan Organization, Teheran

Mr Z. Davidian	Director, International Health Relations Department, Teheran
Dr M. A. Faghih	Associate Professor of Parasitology, Assistant Director, Institute of Parasitology and Malariaology, Teheran
Dr A. Mohtadi	Technical Deputy Director, Malaria Eradication Organization, Department of Environmental Health, Teheran
Dr I. Tabibzadeh	Chief, Division of Epidemiology, Department of Environmental Health, Teheran
Dr T. G. Hendow	Chief of Regional Centre, Southern Area for Endemic Diseases and Basrah City Health Medical Officer, Basrah

UNICEF (United Nations Children's Fund)

Mr Werner Middelmann	Resident UNICEF Director of the Eastern Mediterranean Area, Beirut
Dr O. Lehner	UNICEF Area Representative for Iran and Iraq

US/AID (United States Agency for International Development)

Mr Roger G. Grenier	Malaria Specialist, US/AID, Kerman, Iran
Dr Melvin E. Griffith	Regional Malaria Adviser, US/AID - SEARO, New Delhi
Mr Richard H. James	Malaria Specialist, US/AID, Kermanshah, Iran
Dr Raymond L. Laird	Senior Malaria Adviser, US/AID - India, New Delhi
Mr A. E. Najjar	Senior Malaria Adviser, US/AID, Teheran

WHO Staff

Mr M. A. Acheson	Sanitary Engineer, Ankara, Turkey
Mr S. Axell	Administrative Officer, Malaria Eradication Programme, Teheran

Professor T. L. Chang	Regional Entomologist, EMRO - Alexandria Egypt, United Arab Republic
Dr S. Roy Chowdhury	Senior Malaria Adviser, Baghdad, Iraq
Dr M. A. Farid	Public Health Administrator Malaria, EMRO - Alexandria, Egypt, United Arab Republic
Dr A. Gabaldon	Consultant a.h. Bureau of Malariology and Environmental Sanitation, Ministry of Health and Social Welfare, Caracas, Venezuela (Consultant)
Dr G. Gramiccia	Senior Regional Malaria Adviser, EURO - Copenhagen, Denmark
Mr Chen Kuo	Sanitary Engineer, Malaria Eradication Programme, Teheran
Dr L. Mara	Senior Malaria Adviser, Damascus, Syrian Arab Republic
Dr H. A. H. Mashaal	Senior Malaria Adviser, Lahore, West Pakistan
Dr A. B. Paltrinieri	Senior Malaria Adviser, Dacca, East Pakistan
Mr H. Rafatjah	Public Health Engineer, EMRO - Alexandria Egypt, United Arab Republic
Dr G. Sambasivan	Senior Regional Malaria Adviser, SEARO - New Delhi, India
Dr E. B. Weeks	Chief, Planning and Programme, Division of Malaria Eradication, WHO, Geneva, Switzerland (Secretary)

6. LIST OF DOCUMENTS

EM/ME-Tech.3(a)/1	Order of Proceedings
EM/ME-Tech.3(a)/2	Provisional Agenda
EM/ME-Tech.3(a)/3	List of Documents
EM/ME-Tech.3(a)/4	National Co-ordination Committees on Malaria Eradication, Purposes, Functions and Present Status, by Dr C. A. Alvarado, WHO, Geneva
EM/ME-Tech.3(a)/5	Report on India/Burma/Pakistan Malaria Co-ordination Activities 1961
EM/ME-Tech.3(a)/6	Nomadism and the Operational Difficulties related to it, Other Difficulties Experienced in Maintaining Total Coverage due to Factors Related to Physical Environment, Human Customs and Habits, by Dr S. Roy Chowdhury, Iraq
EM/ME-Tech.3(a)/7	Human Resistance - Practical and Effective Health Education Techniques to be Applied for Promotion of a Malaria Eradication Programme, by Dr S. Roy Chowdhury, Iraq
EM/ME-Tech.3(a)/8	The Malaria Eradication Programme in Iraq, by Dr Tariq Amin, Iraq
EM/ME-Tech.3(a)/9	The Need for Increasing the Training in Epidemiology for Existing Professional Staff as the Malaria Eradication Programme advances towards the Consolidation Phase, by Dr Tariq Amin, Iraq
EM/ME-Tech.3(a)/10	The Present Status of Aircraft Disinsection, by Mr J. W. Wright, WHO, Geneva
EM/ME-Tech.3(a)/11	Simplified Geographical Reconnaissance for Advanced Programmes, by Mr Chen Kuo, Iran
EM/ME-Tech.3(a)/12	Patterns of Health Services Provided to Rural Communities, Contributing Organization, and Plans for Future Development, by Dr Shakir Tawfiq, Iraq

- EM/ME-Tech.3(a)/13 The Development of a Central Malaria Eradication Epidemiological Unit in the Department of Preventive Medicine of the Ministry of Health, by Dr Chamseddine M. H. Mofidi, Institute of Parasitology and Malariology, Iran
- EM/ME-Tech.3(a)/14 The Establishment of an Assessment Team Attached to the Malaria Eradication Board for the Technical Auditing of the Activities during the Consolidation Phase, by Dr Chamseddine M. H. Mofidi, Institute of Parasitology and Malariology, Iran
- EM/ME-Tech.3(a)/15 Radical Cure of Malaria and Operational Difficulties in its Implementation, by Dr Tariq Amin, Iraq
- EM/ME-Tech.3(a)/16 Difficulties Encountered in Maintaining Total Coverage due to Factors related to Physical Environment or Human Customs and Habits, by Dr A. B. Paltrinieri, East Pakist
- EM/ME-Tech.3(a)/17 Review of the Recommendations and the Mechanism for Effecting Inter-Country Co-ordination with a View to the Ultimate Development of a Sub-Regional Co-ordinated Plan for Malaria Eradication, by Dr G. Gramiccia, WHO/EURO
- EM/ME-Tech.3(a)/18 Nomadism and the Operational Difficulties related to it, with Special Reference to Iran, by Dr M. A. Faghhih, Dr Gh. Jalali and Dr Motabar, Institute of Parasitology and Malariology, Iran
- EM/ME-Tech.3(a)/19 Radical Cure of Malaria in Jordan
- EM/ME-Tech.3(a)/20 Progress Report on Malaria Eradication Programme in Pakistan, by Lt. Col. M. K. Q. Hashmi, NMES, Pakistan
- EM/ME-Tech.3(a)/21 The Anopheline War - The Story of Malaria Eradication in Iran

- EM/ME-Tech.3(a)/22 Progress Report on Malaria Eradication in Afghanistan with a stress on the measures taken against Frontier Malaria Problems, by Dr Abdul Qadeer, Malaria Institute of Afghanistan and Dr J. Rahman, WHO/Afghanistan
- EM/ME-Tech.3(a)/23 Nomadism and the Operational Difficulties related to it, by Dr Abdul Qadeer, Malaria Institute of Afghanistan and Dr J. Rahman, WHO/Afghanistan
- EM/ME-Tech.3(a)/24 Pattern of Health Services provided to Rural Communities, Contributing Organizations and Plans for Future Development, by Dr Abdul Qadeer, Malaria Institute of Afghanistan and Dr J. Rahman, WHO/Afghanistan
- EM/ME-Tech.3(a)/25 Difficulties experienced in maintaining Total Coverage due to factors related to Physical Environment or Human Customs and Habits, by Dr Abdul Qadeer, Malaria Institute of Afghanistan and Dr J. Rahman, WHO/Afghanistan
- EM/ME-Tech.3(a)/26 Report on Iran-Iraq Malaria Co-ordination Activities by General Department of Environmental Health, Iran
- EM/ME-Tech.3(a)/27 Radical Treatment of Malaria and Operational Difficulties in Implementation, by Dr I. Tabibzadeh, Chief, Division of Epidemiology Iran
- EM/ME-Tech.3(a)/28 Review of the Quarantine Measures recommended to prevent Re-introduction of Malaria to areas in the Maintenance Phase, by Dr Mossadegh, Assistant of Epidemiology Division, Iran
- EM/ME-Tech.3(a)/29 Difficulties experienced in maintaining Total Coverage due to factors related to Physical, Environmental, or Human Customs and Habits, by Engineer A. H. Alami, Chief, Field Operations, Department of Environmental Health, Iran

- EM-ME-Tech.3(a)/30 Asymptomatic Malaria Cases, Comparative Evaluation of Case Detection Methods, by Dr A. Mohtadi, Technical Deputy of Malaria Eradication Organization, Iran
- EM/ME-Tech.3(a)/31 Asymptomatic Malaria Cases and their Detection, by Dr V. Parisi, Regional Malariaologist, WHO/SEARO
- EM/ME-Tech.3(a)/32 Progress Report on Malaria Eradication in India with a stress on the measures taken against Frontier Malaria Problems, by Dr A. P. Ray, Director, National Malaria Eradication Programme, India
- EM/ME-Tech.3(a)/33 Radical Cure of Malaria and Operational Difficulties in Implementation, by Dr A. P. Ray, Director, National Malaria Eradication Programme, India
- EM/ME-Tech.3(a)/34 Persistent Malaria Transmission due to Operational and Entomological Factors and Methods to be recommended, by Dr A. P. Ray, Director, National Malaria Eradication Programme, India
- EM/ME-Tech.3(a)/35 Pattern of Health Services to Rural Communities, Contributing Organizations, Plans for Future Development, by Dr A. P. Ray, Director, National Malaria Eradication Programme, India
- EM/ME-Tech.3(a)/36 Preliminary Report on Nomadism in West Pakistan, by Dr H. A. H. Mashaal, WHO Senior Malaria Adviser, West Pakistan
- EM/ME-Tech.3(a)/37 Prevention of Re-introduction of Infection by Dr E. J. Pampana, Florence
- EM/ME-Tech.3(a)/38 Means to Strengthen the National Malaria Eradication Training Centres. Co-ordination of their activities and Exchange of Fellowships and Acceptance of Fellowships from Neighbouring Countries, by Dr A. R. Zahar, WHO Malaria Eradication Training Centre, Cairo

- EM/ME-Tech.3(a)/39 Persistence of Malaria Transmission due to Entomological Factors and the Evaluation Techniques, by Professor T. L. Chang, WHO Eastern Mediterranean Regional Entomologist
- EM/ME-Tech.3(a)/40 The 1962 Malaria Eradication Operations in Syria along the Border Line, by Dr L. Mara, Senior WHO Adviser, Malaria Eradication Programme, Syrian Arab Republic
- EM/ME-Tech.3(a)/41 Persistent Malaria Transmission due to Entomological Factors - Special Reference to the Malaria Vectors of Iran, by Dr M. A. Faghih, Institute of Parasitology and Malariology, Iran
- EM/ME-Tech.3(a)/42 Human Resistance - Practical and Effective Health Education Techniques to be applied for the promotion of a Malaria Eradication Programme, by Engineer H. Malekzadeh, Chief, Public Relations Section, Malaria Eradication Organization, Iran
- EM/ME-Tech.3(a)/43 Progress Report on Malaria Eradication in Iran with a stress on the Measures taken against Frontier Malaria Problem, by Dr P. A. Khabir, Director-General of Environmental Health, Iran
- EM/ME-Tech.3(a)/44 A Short Communication by Professor S. N. Pokrovsky at the Conference on Malaria Eradication, Teheran 1-6 May 1962
- EM/ME-Tech.3(a)/45 A synopsis of Professor S. N. Pokrovsky's Report at the Conference on Malaria Eradication, Teheran 1-6 May 1962
- EM/ME-Tech.3(a)/46 Outline of the Malaria Eradication Programme in Turkey, by Mr A. Acheson, WHO Sanitary Engineer
- Synopsis of Mr Rafatjah on Agenda Item 2
- The Co-ordinated Plan Establishing Priority for the Eradication of Malaria in Continental Europe

INFORMATION SHEET ON MALARIA ERADICATION

Programme in Afghanistan

1. In what year did the eradication activities start? 1958
2. What is the year when consolidation ends in the whole country? 1970
3. Has the plan of operations stipulated stage-wise programme? Yes
If so, for how many years? 12 years
4. Total population of the country: 13 799 037
5. Number of population originally under malaria risk: 4 364 146
6. Number of population in preparatory phase in 1962: Nil
7. Number of population in attack phase in 1962 4 256 855
8. Number of population in consolidation phase in 1962: 87 271
9. Number of population in maintenance phase in 1962: Nil

Epidemiological information regarding border areas (a depth of 20 km approximately)

	<u>I</u>	<u>II</u>	<u>III</u>	<u>IV</u>
10. Names of countries with common borders	IRAN	PAKISTAN	USSR	CHINA
11. Length of common border in km	860	2 365	1 780	70
12. Approximate population	65 000	173 500	170 000	5 000
13. Phase of programme	Attack	Attack	Attack	Non-malarious
14. Transmission season	mid-July to mid-October			
15. Vectors proved	<u>A. superpictus</u> (<u>A. superpictus</u> <u>A. superpictus</u> <u>A. culicifacies</u>)			
" suspected	<u>A. pulcherrimus</u>	Nil	(<u>A. pulcherrimus</u> <u>A. sacharovi</u>)	
16. Susceptibility status of vectors	Susceptible	Susceptible	Susceptible	
17. Insecticide used	DDT 75% wp	DDT 75% wp	DDT 75% wp	
Dosage g/m ²	1.5	1.5	1.5	
Cycle	one	one	one	
Spray period	May/June	May/June	May/June	
18. Number of positive cases	Nil	22	6	

Annex

INFORMATION SHEET ON MALARIA ERADICATION

Programme in India

1. In what year did the eradication activities start? 1958
2. What is the year when consolidation ends in the whole country? 1968
3. Has the plan of operations stipulated stage-wise programme? Yes
If so, for how many years? 10 years
4. Total population of the country. 438 000 000
5. Number of population originally under malaria risk: 424 000 000
6. Number of population in preparatory phase in 1962: Nil
7. Number of population in attack phase in 1962. 276
8. Number of population in consolidation phase in 1962: 148 000 000
9. Number of population in maintenance phase in 1962: Nil

Epidemiological information regarding border areas (a depth of 20 km approximately)

	<u>I</u>	<u>II</u>	<u>III</u>	<u>IV</u>
10. Names of countries with common borders	Pakistan (East)	Pakistan (West)	Burma	Nepal
11. Length of common border in km (approximate)	1 990	2 580	1 120	1 340
12. Approx. population	8 000 000	2 000 000	100 000	4 400 000
13. Phase of programme	Attack	Attack	Attack	Attack
14. Transmission season	July to Oct. throughout the yr. in some areas	July to Oct.	throughout the year	March to April & July to October
15. Vectors proved	<u>A. minimus</u>	<u>A. culicifacies</u>	-	-
" suspected	<u>A. philippinensis</u> <u>A. sundaicus</u>	-	<u>A. minimus</u>	<u>A. fluviatilis</u> <u>A. culicifacies</u>
16. Susceptibility status of vectors	Susceptible	Susceptible	Susceptible	Susceptible

INFORMATION SHEET ON MALARIA ERADICATION

Programme in India (continued)

	<u>I</u>	<u>II</u>	<u>III</u>	<u>IV</u>
17. Insecticide used	DDT	DDT	DDT	DDT
Dosage (each cycle) g/m ²	1	1	2	1
Cycle	2	2	1	2
Spray period I.	1 Feb.-30 Apr.	1 May-15 Jul.	Jan.-March	1 May-15 Jun.
II.	1 Jul.-30 Sept.	16 Jul.-30 Sept.		16 Jul.-30 Sept.
18. Number of positive cases	Active surveillance not instituted in border areas.			
19. Comments.	Institution of surveillance operation in the border areas will depend on the progress made by the neighbouring countries in their malaria eradication programmes. According to the present plan spraying without surveillance is to continue in the border areas till the end of 1964.			

Annex

INFORMATION SHEET ON MALARIA ERADICATION

Programme in Iran

1. In what year did the eradication activities start? 1957
2. What is the year when consolidation ends in the whole country? Responsive area in (1966)
3. Has the plan of operations stipulated stage-wise programme? Yes
If so, for how many years? 5 years more.
4. Total population of the country: 21 000 000
5. Number of population originally under malaria risk. 13 000 000
6. Number of population in preparatory phase in 1962. 2 000 000
7. Number of population in attack phase in 1962. 5 000 000
8. Number of population in consolidation phase in 1962: 6 000 000
9. Number of population in maintenance phase in 1962: -

Epidemiological information regarding border areas (a depth of 20 km approximately)

	<u>I</u>	<u>II</u>	<u>III</u>	<u>IV</u>	<u>V</u>
0. Names of countries with common borders	Iraq	Afghanistan	Pakistan	Turkey	USSR
1. Length of common border in km	1 305	860	600	470	870
2. Approximate population	445 600	100 300	16 000	63 800	305 000
3. Phase of programme	Preparatory Attack Consolidation	Attack	Preparatory Attack	Consolidation	Attack Consolidation
4. Transmission season	3-12 m	4-6 m	6-12 m	3-4 m	3-4 m
5. Vector proved	<u>A. stephensi</u> <u>A. fluviatilis</u> <u>A. superpictus</u> <u>A. sacharovi</u>	<u>A. superpictus</u>	<u>A. stephensi</u> <u>A. culicifacies</u>	<u>A. superpictus</u>	<u>A. superpictus</u>

INFORMATION SHEET ON MALARIA ERADICATION

Programme in Iran (continued)

	<u>I</u>	<u>II</u>	<u>III</u>	<u>IV</u>	<u>V</u>
16 Susceptibility status of vectors	<u>A. stephensi</u> double resis- tant	All susceptible	<u>A. stephensi</u> double resis- tant	All suscept.	All suscept.
17. Insecticide used	DDT	DDT	DDT	DDT	DDT
Dosage g/m ²	2	2	2	2	2
Cycle	one	one	one	one	one
Spray period	two months before transmission season				
18 Number of positive cases	112	75	24*	2	23**
19. Comments					

* Transmission continues in Pakistan border/positives are of 10/villages of infant parasite survey

** The positives are of Khorasan area at USSR border

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INFORMATION SHEET ON MALARIA ERADICATION

Programme in Iraq

1. In what year did the eradication activities start? 1957
2. What is the year when consolidation ends in the whole country? Tentatively 1967
3. Has the plan of operations stipulated stage-wise programme? The programme started on simultaneous coverage of the whole country.
If so, for how many years?
4. Total population of the country. 6.3 million (1957 census)
5. Number of population originally under malaria risk: 4.5 million
6. Number of population in preparatory phase in 1962. Nil
7. Number of population in attack phase in 1962: 0.4 million
8. Number of population in consolidation phase in 1962: 4.1 million
9. Number of population in maintenance phase in 1962: Nil

Epidemiological information regarding border areas (a depth of 20 km approximately)

	<u>I</u>	<u>II</u>	<u>III</u>	<u>IV</u>	<u>V</u>
0. Names of countries with common borders	Iran (East)	Turkey (North)	Syria (West)	Jordan (West)	Saudi Arabia (SW)
1. Length of common border in km	1 305	378	608	120	1 065
2. Approximate population	520 000	91 000	59 000	17 000	Desert
3. Phase of programme	Consolidation along all borders except a small part of Iran border in the North Section				
4. Transmission season	May through October				
5. Vectors proved	<u>A. superpictus</u> <u>A. sacharovi</u> <u>A. stephensi</u>	<u>A. superpictus</u> <u>A. sacharovi</u>	<u>A. superpictus</u> <u>A. stephensi</u>	<u>A. superpictus</u> <u>A. stephensi</u>	-

INFORMATION SHEET ON MALARIA ERADICATION

Programme in Iraq (continued)

	<u>I</u>	<u>II</u>	<u>III</u>	<u>IV</u>	<u>V</u>
16. Susceptibility status of vectors	<u>A. stephensi</u> resistant to dieldrin, high tolerance to DDT <u>A. superpictus</u> susceptible to DDT. <u>A. sacharovi</u> no tests				
17. Insecticide used	DDT North Dieldrin South	DDT	DDT	DDT	-
Dosage g/m ²	DDT 2 Dield. 0.5	-	-	-	-
Cycle	2	-	-	-	-
Spray period	April/May and July/August				
18. Number of positive cases in 1961	<u>Steph.</u> area 9 <u>Superp</u> area 47	-	-	-	-
19. Comments:	<u>A. stephensi</u> area	Imported within country - 1 Imported outside country - 4 Indigenous - 4			
	<u>A. superpictus</u> area.	Indigenous - 47			

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INFORMATION SHEET ON MALARIA ERADICATION

Programme in East Pakistan

1. In what year did the eradication activities start? 1960
2. What is the year when consolidation ends in the whole country? 1974
3. Has the plan of operations stipulated stage-wise programme? Yes
If so, for how many years? 14
4. Total population of the country 51 000 000
5. Number of population originally under malaria risk 51 000 000
6. Number of population in preparatory phase in 1962. 3 800 000
7. Number of population in attack phase in 1962. 1 700 000
8. Number of population in maintenance phase in 1962 -
9. Number of population in consolidation phase in 1962 -

Epidemiological information regarding border areas (a depth of 20 km approximately)

	<u>I</u>	<u>II</u>	<u>III</u>
10. Names of countries with common borders	India (West Bengal)	India (Assam)	Burma
11. Length of common border in km	1 914	1 787	278
12. Approximate population	4 502 000	4 183 000	130 000
13. Phase of programme	In northern part attack and preparatory	-	-
14. Transmission season	April-November	ditto	ditto (?)
15. Vectors proved	<u>A. philippensis</u>	<u>A. philippensis</u>	<u>A. minimus</u> <u>A. superpictus</u>
" suspected	<u>A. culicifacies</u> <u>A. aconitus</u>	<u>A. minimus</u>	<u>A. jeyporiensis</u>
16. Susceptibility status of vectors	Susceptible	Susceptible	Susceptible

INFORMATION SHEET ON MALARIA ERADICATION
Programme in East Pakistan (continued)

	<u>I</u>	<u>II</u>	<u>III</u>
17. Insecticide used	DDT 75% w.d p		-
Dosage g/m ²	2		-
Cycle	1		-
Spray period	March-June		-
18. Number of positive cases	-		-
19. Comments	-		-

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INFORMATION SHEET ON MALARIA ERADICATION

Programme in West Pakistan

1. In what year did the eradication activities start? 1961
2. What is the year when consolidation ends in the whole country? 1973
3. Has the plan of operations stipulated stage-wise programme? In stages
If so, for how many years? 14 years
4. Total population of the country. 42 978 261
5. Number of population originally under malaria risk 37 000 000
6. Number of population in preparatory phase in 1962: 4 588 000
7. Number of population in attack phase in 1962: 2 573 000
8. Number of population in consolidation phase in 1962 None
9. Number of population in maintenance phase in 1962. None

Epidemiological information regarding border areas (a depth of 20 km approximately)

	<u>I</u>	<u>II</u>	<u>III</u>
10. Names of countries with common borders	Afghanistan	Iran	India
11. Length of common border in km	2 365	600	2 850
12. Approximate population	500 000	10 000	1 500 000
13. Phase of programme	Preparatory	Preparatory	Attack
14. Transmission season	Middle June-October		
15. Vectors proved	<u>A. superpictus</u>	-	<u>A. culicifacies</u>
" suspected	<u>A. fluviatilis</u>	-	(<u>A. stephensi</u>) (<u>A. fluviatilis</u>)
16. Susceptibility status of vectors	-	-	<u>A. culicifacies</u> susceptible

INFORMATION SHEET ON MALARIA ERADICATION

Programme in West Pakistan (continued)

	<u>I</u>	<u>II</u>	<u>III</u>
17. Insecticide used	-	-	DDT 75% w.d.p.
Dosage g/m ²	-	-	1
Cycle			2
Spray period	-	-	two months
18. Number of positive cases in 1961 (for Shiekhupura only)	P.v. 151	P.f. <u>Mixed</u> 453 12	574 (cases) total number of slides 21 383
19. Comments	Along the Indian border the attack phase started in 1961 where malaria incidence is the highest. Along the Afghanistan border the attack phase will start in 1965 and along the Iran border in 1966, but at present control operations are conducted along the Afghanistan border.		

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INFORMATION SHEET ON MALARIA ERADICATION

Programme in Syrian Arab Republic

1. In what year did the eradication activities start? 1956
2. What is the year when consolidation ends in the whole country? 1964
3. Has the plan of operations stipulated stage-wise programme? Yes
If so, for how many years? 9 years (5 years + 4 years extension of programme)
4. Total population of the country: 4 500 000
5. Number of population originally under malaria risk: 1 568 000
6. Number of population in preparatory phase in 1962: Nil
7. Number of population in attack phase in 1962: 290 000
8. Number of population in consolidation phase in 1962: 1 248 000
9. Number of population in maintenance phase in 1962: -

Epidemiological information regarding border areas (a depth of 20 km approximately)

	<u>I</u>	<u>II</u>	<u>III</u>	<u>IV</u>	<u>V</u>
10. Names of countries with common borders	Turkey	Iraq	Jordan	Israel	Lebanon
11. Length of common border in km	808	608	352	70	278
12. Approximate population	840 000	113 000	45 000	41 000	140 000
13. Phase of programme	Attack Consol- idation	Attack	Attack	Attack	Attack Consol- idation
14. Transmission season	May/Oct.	May/Oct.	May/Oct.	May/Oct.	May/Oct.
15. Vectors proved	<u>A. sacharovi</u> <u>A. super-</u> <u>pictus</u>	<u>A. sachar-</u> <u>ovi</u> <u>A. super-</u> <u>pictus</u>	<u>A. sachar-</u> <u>ovi</u> <u>A. super-</u> <u>pictus</u> <u>A. ser-</u> <u>genti</u>	<u>A. sachar-</u> <u>ovi</u> <u>A. super-</u> <u>pictus</u> <u>A. ser-</u> <u>genti</u>	<u>A. sachar-</u> <u>ovi</u> <u>A. super-</u> <u>pictus</u>
" suspected	-	-	-	-	-

INFORMATION SHEET ON MALARIA ERADICATION
Programme in Syrian Arab Republic (continued)

	<u>I</u>	<u>II</u>	<u>III</u>	<u>IV</u>	<u>V</u>
16. Susceptibility status of vectors	suscept.	suscept.	suscept.	suscept.	suscept
17. Insecticide used	DDT	DDT	DDT	DDT	DDT
Dosage g/m ²	2	2	2	2	2
Cycle	1 & 2	1	2	2	1 & 2
Spray period	15 Mar./ 15 Jul.	15 Mar./ 16 Apr.	15 Mar./ 15 Jul.	15 Mar./ 15 Jul.	15 Mar./ 15 Sept.
18. Number of positive cases	3 P.v. 1 P.m.			9 P.v.	1 P.v. 4 P.f.

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INFORMATION SHEET ON MALARIA ERADICATION

Programme in Turkey

- 1 In what year did the eradication activities start? 1957
2. What is the year when consolidation ends in the whole country? 1968
- 3 Has the plan of operations stipulated stage-wise programme? No
If so, for how many years?
4. Total population of the country 28 000 000
5. Number of population originally under malaria risk: 23 439 859
6. Number of population in preparatory phase in 1962: -
- 7 Number of population in attack phase in 1962. 9 753 736
- 8 Number of population in consolidation phase in 1962. 15 392 868
9. Number of population in maintenance phase in 1962: -

Epidemiological information regarding border areas (a depth of 20 km approximately)

	<u>I</u>	<u>II</u>	<u>III</u>	<u>IV</u>
10. Names of countries with common borders	Syria	Iraq	Iran	USSR
11. Length of common border in km	808	378	470	590
12 Approximate population	588 000	43 000	44 000	177 000
13 Phase of programme	Attack	Attack	Attack	Consolidation
14. Transmission season	Apr.-Nov.	Apr.-Nov.	Jul.-Sept.	June-Sept.
15. Vectors proved	<u>A. superpictus</u> <u>A. sacharovi</u>	<u>A. superpictus</u> <u>A. sacharovi</u>	<u>A. superpictus</u>	<u>A. superpictus</u> <u>A. sacharovi</u>
" suspected	<u>A. claviger</u>	<u>A. claviger</u>	<u>A. maculipennis</u> spp.	-
16 Susceptibility status of vectors	susc (1)	susc.	susc.	susc.

INFORMATION SHEET ON MALARIA ERADICATION

Programme in Turkey (continued)

	<u>I</u>	<u>II</u>	<u>III</u>	<u>IV</u>
17. Insecticide used	DLD/DDT	DDT	DDT	DDT(2)
Dosage g/m ²	0.6/2	2	2	2
Cycle	1	1	1	-
Spray period	15 Mar.-15 May	15 Mar.-15 May	15 May-30 June	-
18. Number of positive cases (1961)	45	? (3)	0	80 (4)
19. Comments:	(1) The area where <u>A. sacharovi</u> was found resistant to DDT does not adjoin the frontier.			
	(2) Residual foci only.			
	(3) Case detection was not organized during 1961.			
	(4) All found in a focus near Savaat.			

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INFORMATION SHEET ON MALARIA ERADICATION

Programme in the USSR

1. In what year did the eradication activities start? 1950
2. What is the year when consolidation ends in the whole country? 1962
3. Has the plan of operations stipulated stage-wise programme? No
If so, for how many years?
4. Total population of the country: 216 151 000
5. Number of population originally under malaria risk: 204 531 000
6. Number of population in preparatory phase in 1962:
7. Number of population in attack phase in 1962: 90 000
8. Number of population in consolidation phase in 1962. 2 000 000
9. Number of population in maintenance phase in 1962: 202 441 000

Epidemiological information regarding border areas (a depth of 20 km approximately)

	<u>I</u>	<u>II</u>	<u>III</u>	<u>IV</u>
10. Names of countries with common borders	Romania	Turkey	Iran	Afghanistan
11. Length of common border in km	870	590	870	1 780
12. Approximate population	?	?	?	?
13. Phase of programme	Maint.	Consol.	Attack- Consol.	Attack- Consol.
14. Transmission season	June/Oct.	June/Oct.	May/Nov.	June/Oct.
15. Vectors proved	<u>A. messeae</u> <u>A. m. maculipennis</u> <u>A. l. atropicus</u>	<u>A. m. maculipennis</u> <u>A. superpicatus</u>	<u>A. m. maculipennis</u> <u>A. superpicatus</u> <u>A. sacharovi</u>	<u>A. sacharovi</u> <u>A. superpictus</u>
" suspected				<u>A. pulcherrimus</u>
16. Susceptibility status of vector	susc.*	susc.*	susc.*	susc.*
17. Insecticide used	DDT-BHC	DDT-BHC	DDT-BHC	DDT-BHC

⁷⁵ presumed

INFORMATION SHEET ON MALARIA ERADICATION

Programme in the USSR (continued)

	<u>I</u>		<u>II</u>		<u>III</u>		<u>IV</u>	
Insecticide dosage g/m ²	1.5	2	1.5	2	1.5	2	2	2
Cycle	1	2	1	2	1	2	1	2
Spray period	Mar.-Apr.	Apr.-July	Mar.-Apr.	Apr.-July	Mar.-Apr.	Apr.-July	Mar.-Apr.	Apr.-July
18. Number of positive cases	-		-		2		76	
19. Comments:	Data collected from WHO/EURO							