

EM/MAL/216-E  
September 1987

**REGIONAL TECHNICAL CONSULTATION ON  
MALARIA CONTROL AND PRIMARY HEALTH CARE**

Amman, Jordan, 27 June - 2 July 1987

(Meeting Reference: EM/REG.TEC.CNS.MLC.PHC/4)



**WORLD HEALTH ORGANIZATION  
REGIONAL OFFICE FOR THE EASTERN MEDITERRANEAN  
1987**

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## 1. INTRODUCTION

A Regional Technical Consultation on Malaria Control and Primary Health Care was convened in Amman, Jordan, from 27 June to 2 July 1987.

The objectives of this consultation were to analyse the malaria situation and the progress made in malaria control in the countries of the Eastern Mediterranean Region, giving particular attention to the implementation of anti-malaria activities within the developing primary health care (PHC) system. The consultation was also to provide guidance regarding the application to countries of the Region of the recommendations of the Eighteenth WHO Expert Committee on Malaria.

## 2. OPENING SESSION

The meeting was opened by H.E. The Minister of Health, Dr Zeid Hamzeh, who welcomed the participants. The message of Dr Hussein A. Gezairy, Director, WHO Regional Office for the Eastern Mediterranean, was delivered by Dr A.M. Abdul Hadi, WHO Representative, Amman, Jordan. In his message, Dr Gezairy stated that malaria is still an important public health problem in many countries of the Region. It was also considered that malaria control programmes need to be based on PHC and be an integral part of national health systems. To achieve these objectives, responsibilities may need to be redistributed and shared between the different components of the health system and there is need for a full and active community involvement in as many as possible of the anti-malaria activities.

### 2.1. Election of Officers

Dr M.R. Tawfik (Jordan) was elected Chairman of the meeting and Dr I.H. Shah (Pakistan) Vice-Chairman and Rapporteur.

## 3. THE GLOBAL STRATEGY OF MALARIA CONTROL WITHIN PRIMARY HEALTH CARE

Primary health care (PHC) has been defined as essential health care made universally accessible to individuals and families in the community, by means acceptable to them, through their full participation and at a cost that the community and country can afford. It forms an integral part both of the country's health system, of which it is a nucleus, and of the overall social and economic development of the country. The PHC approach identifies eight essential elements, one of which is the control of prevalent endemic diseases. PHC thus provided a basis for the formulation of a malaria control strategy, which was adopted by the 31st World Health Assembly; this strategy is based on the following principles:

- (a) The national will to control the disease should be clearly expressed through a governmental decision to support anti-malaria activities on a long-term basis.
- (b) Malaria control should be an integral part of the country's health programme.
- (c) The feasibility and practicability of reducing malaria to a level concordant with the set objectives should be demonstrated.
- (d) The participation of the community should be a condition *sine qua non*; emphasis should be placed on the community's understanding of the effects of the different methods of control, since success will greatly depend on this.

- (e) wherever applicable, permanent measures for the control of malaria should be made an integral part of the relevant development programmes (e.g. irrigation, drainage, hydro-electric schemes, highways) with the collaboration of the ministries and other agencies concerned.

The implementation of the malaria control strategy is hampered by the still-unresolved problems of integration of the vertical structures of the malaria eradication programmes into national health infrastructures, or the transformation of a campaign into a service.

Programmes have not been able to follow changing epidemiological patterns and the development of new problem areas with a redeployment of resources; as a result, most endemic countries show serious mismatches between the geographical distribution of the malaria problem and the resources for malaria control.

Integration into the infrastructure has often been effected as an administrative formal decision, without a serious review of the integrated programmes themselves, and has led to the accumulation of duties of the peripheral health workers, without any improvement in their capacity of action.

In spite of technical problems, present technical knowledge is adequate for controlling most epidemiological situations. However, maintenance of this control depends upon the ability to sustain an appropriate response mechanism.

In 1985 the Thirty-eighth World Health Assembly<sup>1</sup> recommended the integration of malaria control within national PHC systems, and the urgent review of national malaria situations and current anti-malaria activities being carried out, not only in terms of their effectiveness, but also in terms of the feasibility of maintaining the levels of control being achieved.

Following the recommendation of the Thirty-eighth World Health Assembly, the Eighteenth WHO Malaria Expert Committee<sup>2</sup> in 1985 reviewed the world malaria situation and recommended that the design of malaria control should be based on an epidemiological approach, recognizing that there is no single solution applicable everywhere and that the local variability of the problem and the applicability of potential interventions required a stratification of the malaria problem in every endemic country; based on this stratification, interventions should be redesigned in order to achieve:

- (a) The establishment, on the principle of total population coverage, of an appropriate mechanism for management of the disease problem in endemic areas.

This is considered a necessary response to obvious population needs and should include, as a minimum, the provision of adequate facilities for diagnosis and treatment of fevers, accessible to the whole population. These facilities should be integrated into the PHC infrastructure and should be supported by a referral system capable of managing the treatment of severe malaria cases and the differential diagnosis of cases failing to respond to the treatment given at the periphery. This should be the basis for the

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<sup>1</sup> Thirty-eighth World Health Assembly Resolution WHA38.24.

<sup>2</sup> Eighteenth Report of the WHO Expert Committee on Malaria, WHO Technical Report Series No. 735, 1986.

monitoring of the spread or intensification of parasite resistance to antimalarial drugs. This infrastructure should also provide the mechanism for the promotion of the use of measures of individual or community protection against malaria transmission; it should also be the basis for the development of the epidemiological services which should guide the application of more complex solutions to local problems. The role of malariologists is to make available to the health services the required guidance to ensure the best possible quality of the services provided.

(b) The selective implementation of organized activities aimed at the control of malaria transmission.

These activities should be addressed to well-defined objectives, with particular emphasis given to the possibility of maintaining the benefits achieved; in other words, sustained, even if slow, progress should be preferred to rapid effectiveness, difficult to maintain. It is imperative that the whole process of planning, implementation and monitoring, as well as the evaluation of results, be guided by appropriate technical competence.

Primary health care is not viewed as a technological alternative, but as the general approach for health development; neither is a fully developed health infrastructure necessarily a prerequisite for anti-malaria activities. What is envisaged is that, whatever kind of structural elements exist at present, the malaria programmes should collaborate in developing a health structure for primary health care, within which the control of malaria should be viewed as an essential component in endemic areas and should be pursued as the common responsibility of the general and the specialized health services, among which an appropriate distribution of functions should be achieved.

#### 4. MALARIA SITUATION IN COUNTRIES OF THE EASTERN MEDITERRANEAN REGION

##### 4.1. The epidemiological situation

The overall epidemiological situation, as related to the endemicity of malaria, has changed in some countries. It is to be noted that, while some programmes have showed progress, others remain unchanged, and in some countries deterioration has occurred.

It may be noted that the twenty-three countries of the Eastern Mediterranean Region are divided into three groups as follows:

(a) Nine malaria-endemic countries with long-standing nationwide malaria control programmes, namely Afghanistan, Egypt, Islamic Republic of Iran, Iraq, Morocco, Pakistan, Saudi Arabia, Syrian Arab Republic and United Arab Emirates.

Table 1.  
Laboratory-confirmed malaria cases in countries  
with nationwide malaria control programmes  
(1980-1986)

	<u>1980</u>	<u>1981</u>	<u>1982</u>	<u>1983</u>	<u>1984</u>	<u>1985</u>	<u>1986</u>
Afghanistan	40 784	87 442	110 309	118 684	155 720	227 815	377 808
Egypt	370	316	365	198	144	72	63
Iraq	2 815	2 544	3 326	2 422	3 340	4 451	2 953
Iran, Islamic Republic of	32 635	29 655	42 816	45 916	30 835	26 363	32 084
Morocco	—	—	—	—	—	—	—
Pakistan	17 707	37 923	56 360	51 596	73 996	77 607	90 312
Saudi Arabia	6 496	5 543	15 167	17 956	11 091	16 242	12 975
Syrian Arab Republic	1 481	1 828	2 183	1 260	840	435	273
United Arab Emirates	8 560	7 653	6 224	4 815	3 516	2 599	3 070
<b>TOTAL</b>	<b>110 848</b>	<b>172 904</b>	<b>236 750</b>	<b>242 847</b>	<b>279 482</b>	<b>405 584</b>	<b>519 538</b>

From this table, it is clear that the number of cases reported from Afghanistan alone in 1984, 1985 and 1986 exceeded the total number of cases reported from the remaining eight countries. This gives a measure of the deterioration of the malaria situation in Afghanistan due to the conditions prevailing in that country.

(b) Six malaria-endemic countries with no nationwide malaria programme. These are: Democratic Yemen, Djibouti, Oman, Somalia, Sudan and Yemen. Only approximately 60% of the population at risk in these countries are protected and the malaria control programme in each of them does not cover the whole country. Therefore, the data received is not indicative of the real situation, but shows the annual trend of malaria in these countries (Table 2).

Table 2.  
Laboratory-confirmed malaria cases in countries  
without nationwide malaria control programmes  
(1980-1986)

	<u>1980</u>	<u>1981</u>	<u>1982</u>	<u>1983</u>	<u>1984</u>	<u>1985</u>	<u>1986</u>
Democratic Yemen	2 153	4 079	7 609	9 294	3 615	3 013	3 297
Djibouti	69	1 271	60	54	68	287	—
Oman	1 113	2 218	30 566	34 885	16 590	16 455	—
Somalia	6 850	11 649	7 921	4 900	3 054	3 382	4 355
Sudan	2 894	2 168	3 446	—	7 723	8 526	—
Yemen	5 824	10 029	20 641	2 168	1 262	1 178	1 846
<b>TOTAL</b>	<b>18 903</b>	<b>31 414</b>	<b>70 243</b>	<b>51 301*</b>	<b>32 312</b>	<b>32 841</b>	<b>9 498*</b>

\* Incomplete data

Considerable progress has been made in the coverage of the population in Djibouti and Oman where it reached >80% of the population at risk. In the other four countries, namely Democratic Yemen, Somalia, Sudan and Yemen, the population covered with malaria control operations reached about 60% of the population at risk.

In Oman, with better surveillance and increased coverage, the malaria situation is improving. It has also improved in Yemen since 1983, when the most endemic area was protected by DDT spraying; also, Abate larviciding has recently been carried out there.

In Somalia and Sudan, the malaria situation is considered to be deteriorating, while in Democratic Yemen it is unpredictable as malaria occurs in epidemic waves, for example, in 1982 and 1983. However, during the period under review the malaria situation in Democratic Yemen seems to be stable.

(c) Eight countries which are considered to be malaria-free. These are: Bahrain, Cyprus, Jordan, Kuwait, Lebanon, Libyan Arab Jamahiriya, Qatar and Tunisia. Reported cases are all imported (see Table 3), mainly due to the immigration of labourers from malaria-endemic countries. The trend which started to show a marked increase in the Eastern Mediterranean Region in 1981 is now diminishing. Bahrain, Kuwait and Qatar illustrate this situation in the Gulf area.

Table 3.  
Number of imported cases in malaria-free countries  
(1980-1986)

	<u>1980</u>	<u>1981</u>	<u>1982</u>	<u>1983</u>	<u>1984</u>	<u>1985</u>	<u>1986</u>
Bahrain	256	274	278	302	363	327	252
Cyprus	2	6	1	1	0	1	2
Jordan	202	274	233	178	312	458	297
Kuwait	98	143	366	491	588	504	465
Lebanon	4	9	5	18	18	8	3
Libyan Arab Jamahiriya	91	1 473	114	129	177	71	--
Tunisia	7	1	5	10	5	21	--
Qatar	62	116	182	606	198	208	184
<b>TOTAL</b>	<b>722</b>	<b>2 296</b>	<b>1 184</b>	<b>1 735</b>	<b>1 661</b>	<b>1 598</b>	<b>1 203*</b>

\* incomplete data.

Integrated vector control measures are being used more and more by countries in the Region. Malaria workers are thus instructed to control other parasitic diseases such as leishmaniasis, schistosomiasis and intestinal parasitic infections. This approach, although sometimes placing an additional burden on malaria staff, is generally encouraged and is being implemented in Egypt, Jordan, Sudan and Syrian Arab Republic. Similar plans are being developed in Islamic Republic of Iran, Somalia and Tunisia.



#### 4.2. Problems and constraints

Malaria control in the Region has been confronted with several problems, but reference is made here to those problems that have, or will have, an adverse effect on the progress of malaria control. These are:

(a) The existence of disturbed conditions in some countries e.g. Afghanistan and Lebanon which makes it difficult, or sometimes impossible, to know the malaria situation exactly and to estimate the degree of progress or setback.

(b) Slow progress; this has been observed in the southern and south-western part of the Region where *P. falciparum* is prevalent and is transmitted by the highly efficient Afro-tropical vector *A. arabiensis* of the *A. gambiae* complex. It is important to note that, in most of this area, the development of the primary health care system has been less satisfactory than in other areas of the Region. Hence, active steps should be undertaken to accelerate the development of primary health care to ensure at least malaria diagnosis and treatment.

(c) Chloroquine resistance to *P. falciparum*: Confirmed cases of *P. falciparum* resistance to chloroquine have been reported from: Punjab Province, Pakistan; eastern and southern regions of Afghanistan bordering Pakistan; eastern and southern provinces of Islamic Republic of Iran extending from the Pakistan borders; Mogadishu and the surrounding area in Somalia; and the Khartoum and Port Sudan areas in Sudan. Suspected *P. falciparum* resistance to chloroquine covers a wider area. Despite this, chloroquine is still the drug of choice as it remains effective in the larger part of the Region but, with the influx of a labour force from south-east Asia, there is always the threat of importation of chloroquine-resistant cases. The problem will be aggravated if chloroquine resistance becomes widespread in the Region; a second line of antimalarial drugs should therefore be sought.

(d) Resistance to insecticides remains the most important technical problem facing the malaria programmes in the Region. Major malaria vectors such as *A. culicifacies*, *A. arabiensis* and *A. sacharovi* have become problem species and their control by residual chemical insecticides is becoming increasingly costly and difficult.

#### 5. CASE STUDIES

Three case studies selected from countries in the Region representing the three groups mentioned above are presented hereunder. Pakistan represents the first group of countries, having a long-standing nationwide malaria control programme. Sudan represents the second group, with endemic malaria but no nationwide control programme. Finally, Jordan represents the third group, considered to be malaria-free.

##### 5.1. Malaria control in Pakistan

Climatic as well as socio-economic conditions favour the transmission of malaria among the greater part of Pakistan's 97.5 million population. The malaria problem is further aggravated by epidemic waves affecting the irrigated plains of Punjab and Sind, the most densely populated parts of the country. Agriculture continues to be the backbone of the national economy,

providing 45% of the total employment. The ratio of rural to urban population is 70:30 but the transmission of malaria in towns and large cities requires, as experience has shown, their inclusion into the anti-malaria programme. The main vector in rural areas is *A. culicifacies* and in towns *A. stephensi*.

Realizing the widespread morbidity caused by malaria, the Government of Pakistan launched a 14-year (1960-74) plan for its eradication in 1960. Despite the dramatic early success of this programme, malaria incidence started showing an upward trend in the late sixties. The reliance solely on house spraying with residual insecticides, the exclusion of urban areas from the programme, the poor participation of the general health services, the overall socio-economic profile of the country and the development of vector resistance to DDT/BHC were some of the major causes of deterioration of the situation. By 1972 Pakistan was in the grip of a devastating epidemic with 642 958 microscopically confirmed malaria cases, while the actual number of malaria cases was estimated to be at least 10 million.

A five-year plan (1975-80) was launched to deal effectively with the prevailing epidemic conditions of the early 1970s and to progressively reduce malaria incidence to a level where the disease would be no longer a major public health problem. The goal of eradication as the ultimate objective of the programme was retained. For the efficient implementation of this plan, a number of administrative and technical changes were introduced. Provincialization of the malaria programme was carried out but its overall direction and the supply of insecticides, equipment and transport remained the responsibility of the Federal Government. Other major changes introduced during this period were the replacement of DDT/BCH by Malathion and the inclusion in the programme of urban areas as well as of Azad Kashmir.

The successful execution of this plan reduced malaria transmission from a slide positivity rate of 14.09% in 1973 to 0.59% in 1980. However, the Malaria Control Programme found itself in a situation similar to that of the late sixties due to the epidemiological pattern of unstable malaria prevailing in Pakistan.

To face this situation a second five-year plan (1982-87) is currently being implemented to keep malaria under effective control. In quantitative terms, malaria incidence was to be kept at 0.5 cases/1000 population. For the attainment of this objective, reliance has been placed on selective spraying of highly positive localities, involving 25% of the population of the country, and the depletion of the infective reservoir through an improved system of surveillance. Greater stress has been laid on the development of passive case detection which is a comparatively inexpensive yet efficient system.

Despite various setbacks, the Malaria Control Programme has been able to achieve almost all the major objectives of this plan. Malaria incidence has been kept very close to the stipulated level in most parts of the country, with the possible exception of the central districts of Punjab during 1983-85. It can be stated that, in the absence of an effective control programme, the situation would have been probably worse than during the 1972-75 epidemic due to the development of chloroquine resistance in *P. falciparum*.

The improvement of passive case detection has resulted in an increase of the slide positivity rate, due to the fact that, after decentralization of

parasitology laboratories the chances of detection of positive slides have increased. This may account in part for the increase of laboratory-confirmed cases seen in Pakistan during the last year (Table 1).

The basic philosophy of the proposed Third Extension Plan (1987-93) revolves round the control of malaria through a primary health care approach. The experience of the past three decades has shown that the spectacular achievements of mass campaigns are difficult to maintain in the absence of (a) an adequate infrastructure and (b) community support. Accordingly, stress is being laid on channelling malaria control activities through the emerging network of primary health care facilities and involving the community through the development of voluntary collaboration.

According to the new strategy of malaria control, emphasis will be shifted from indoor residual spraying to an efficient system of malaria surveillance which will reduce the use of insecticides considerably.

## 5.2. Malaria control in Sudan

Malaria is the main endemic parasitic disease in the country. The endemicity of the disease ranges from holo-economic in the south to hypo-endemic in the north. The endemicity of the disease follows more or less the natural distribution of the geographical zones. Malaria is holo-endemic in the equatorial and rich savannah belt, hyper-endemic in the savannah zone, meso-endemic in the poor savannah and semi-desert zone in Central Sudan and hypo-endemic along the main Nile in the northern part of the country and along the Red Sea. Accordingly, transmission ranges from perennial in the south to seasonal in the other parts of the country. In the irrigated areas in Central Sudan, transmission has changed from seasonal to perennial and endemicity is changing from meso- to hyper-endemic.

Three vector species have been identified: *A. gambiae*, which is geographically restricted to the southern part of the country; *A. arabiensis*, which extends from the south and reaches up to the northern limit near the Egyptian border and which is considered as the principal vector of the country, and *A. funestus*, which is found in the southern part of the country.

The predominant parasite species is *P. falciparum* which is responsible for about 90% of human infections. However, *P. vivax* is widespread in the eastern part of the country and may reach up to 20% close to the Ethiopian borders. *P. malariae* is reported to occur sporadically.

According to the Ministry of Health's previous plans, there should be a malaria division in each province, but actually there is only a proper malaria division in Blue Nile Province, apart from Khartoum.

The malaria control activities, if any, are carried out by medical as well as paramedical personnel, this mainly through chemotherapy in most cases without microscopic diagnosis. Giemsa stain is only used in the Khartoum and Blue Nile Province laboratories, and even some of these are not using it. It is only used extensively in all the malaria laboratories of the Blue Nile Health Project (BNHP). Treatment is decided on a clinical basis, except in hospitals where stains other than Giemsa are used.

Antimalarial drugs, especially chloroquine, are available all over the country, especially in primary health care units, dressing stations, dispensaries, and health centres, as well as in rural hospitals. Cases which do not respond to treatment are referred to hospitals from the primary health care unit or dispensaries, etc. In most cases, the relatives of patients who do not respond to antimalarials take them to the nearest doctor or hospital.

In the Northern Region malaria is hypo-endemic with seasonal transmission, with a decrease or lack of transmission in the hot months of the summer and mainly along the river Nile. Malaria is unstable and, in the absence of control measures, waves of malaria epidemics occur, especially in irrigation projects.

Chloroquine resistance based on *in vivo* tests was reported in the northern area of Khartoum, but not confirmed. *In vitro* tests were not done. The same area was investigated again but there was no evidence of resistance.

Vector control based on residual house spraying is carried out mainly in the major towns once a year, before the transmission season, and in some irrigated projects.

In the northern part of the Northern Region a joint programme between the Governments of Sudan and Egypt is in progress and aims at the control of *A. arabiensis* to prevent its introduction into southern Egypt. Antimalarial drugs are available in all the health institutions.

The Central Region of Sudan is characterized by having several irrigation schemes, among which is the large Gezira irrigated scheme and several irrigated sugar plantation projects, e.g. Kenana, Assalaya, Gineid and Sennar. Malaria ranges between meso- to hyper-endemicity. The Gezira Province is sprayed by the BNHP and part of the White Nile and Blue Nile Provinces are sprayed with Fenitrothion from the BNHP; this comprises the area adjacent to BNHP which acts as a buffer zone. Antimalarial drugs are available in all health posts. Laboratories for malaria diagnosis are available in hospitals and some health centres only.

The Blue Nile Health Project (BNHP) is an Integrated Disease Control Project, covering a population of 2 million, which deals mainly with the control of water-associated diseases (malaria, schistosomiasis and diarrhoeal diseases) in irrigated schemes of the Central Region.

The strategy of the project is based on the application of integrated control measures using chemical control, case detection and treatment, environmental management, biological control and community participation. The ultimate objective of the project is to reduce reliance on chemical control and emphasize the need for the establishment of long-term applicable control measures. In the project area, malaria prevalence is maintained at a level of about 1%.

Community volunteers sometimes carry out residual spraying for malaria control; besides this, they eliminate the breeding places of mosquitoes in and around villages. Sometimes, in large villages and towns they carry out larviciding under the supervision of a "mosquito man".

In the Eastern Region, malaria ranges between hypo- to meso-endemic. The transmission season coincides with the rainy season. Malaria control is concentrated in the irrigated New Halfa Project to protect the non-immune Nubian population. Residual insecticides are used mainly in New Halfa, Kassala and Port Sudan. Antimalarial drugs are available in all health posts.

Recently *in vitro* tests indicated chloroquine resistance on the eastern borders with Ethiopia. The influx of refugees is very large in this area.

In the Western Region malaria is meso-endemic with seasonal transmission. Vector control is limited and malaria is dealt with by the primary health care system through chemotherapy.

In the Southern Region, malaria ranges from hyper- to holo-endemic. Limited vector control is carried out in major towns. Malaria chemotherapy is made available through the primary health care units.

### 5.3. Malaria control in Jordan

No indigenous cases of malaria have occurred in Jordan since 1970, despite the considerable number of imported cases, shown in Table 3, coming to the country. These are mostly among immigrant labourers from south-east Asian countries; in Jordan they often work in areas of high receptivity to malaria.

To face this problem, the national Malaria Eradication Programme has evolved in a pragmatic way, with simple and effective methods for the screening of travellers. As a first step, passengers are provided on board their aircraft with cards to complete in English and Arabic. If they come from well-known malarious areas and have fever or there is a suspicion of malaria, a blood film is taken and presumptive treatment is given. As the address in Jordan is shown on the completed malaria cards, these passengers as well as others coming from malarious areas, are followed up for radical treatment if necessary.

In view of the many imported cases detected among labourers from south-east Asia, strict measures are taken in relation to these travellers. All labourers and their families receive full radical treatment and must be in possession of a malaria card showing that such treatment has been administered. Without a duly completed card permission to work is refused.

To implement the above measures, the Malaria Eradication Programme keeps a sufficient number of agents permanently on duty at Amman Airport, railway stations and border posts. Malaria surveillance agents are also present in the malaria-receptive areas of the country, making house-to-house visits fortnightly for the detection of fever cases. During their visits, they also collect urine samples from any person complaining of haematuria, for screening of schistosomiasis. They also look for any skin lesions among the local inhabitants and they collect sputum from suspected tuberculosis cases. Samples are then sent to the appropriate centres to be examined and cases are treated and followed up, if positive.

After more than twenty-five years, larviciding continues to be the mainstay of the antimalaria operations in Jordan. Residual spraying alone cannot interrupt transmission in the country due to the outdoor sleeping habits of

the local inhabitants and the outdoor resting and biting habits of the two most important vectors, *A. sergenti* and *A. superpictus*. Larviciding with Abate, although more expensive, is more effective than residual spraying under the conditions prevailing in Jordan. The population in Jordan protected by residual spraying and larviciding in 1986 was 86 389 and 717 954 respectively.

The possibility of suppressing or reducing these measures, in view of the absence of transmission, was considered, particularly as regards residual spraying. The prolonged use of this method has produced, as would be expected, a certain amount of "resistance" among the local inhabitants, particularly among the younger ones who have not seen the ravages of malaria. Despite these difficulties, the coverage in Jordan during 1973 and 1974 was 86 and 88 percent, respectively. These figures, however, could only be obtained through much effort and persistence on the part of those in charge of the operations.

## 6. GUIDANCE TO THE IMPLEMENTATION OF THE EPIDEMIOLOGICAL APPROACH TO MALARIA CONTROL

### 6.1. Planning

It is realized that the countries of the Eastern Mediterranean Region widely differ in population size, socio-economic status, malarionogenic potential, the state of development of primary health care and their antimalaria services. Therefore, each country has to select appropriate antimalaria measures in the context of primary health care and in the light of the recommendations of the WHO Eighteenth Expert Committee on Malaria.

The proposed changes to existing country approaches to malaria control are as follows:

6.1.1. The primary health care system is considered to be the backbone of health care services in a country and malaria control activities should be channelled through it. Timely diagnosis and treatment of malaria should be developed as an essential part of primary health care. However, realizing that the staff within this system may not possess the necessary knowledge and skills of antimalaria measures, it is a matter of priority that all categories of staff receive appropriate training in malaria control.

6.1.2. In some countries of the Region, other parasitic diseases, such as schistosomiasis and leishmaniasis, are important public health problems for which programmes have been formulated and which could share with malaria their epidemiological systems and response mechanisms.

6.1.3. It has been observed that, in some instances, the distribution of manpower and financial resources is not in accordance with the real prevalence of the disease. Therefore, a redistribution of such resources in accordance with epidemiological needs is of vital importance. Proper stratification of areas on the basis of the magnitude of the malaria problem, the development of health services and socio-economic development, must precede such redistribution of resources.

6.1.4. In some instances, it is observed that most technical and managerial decisions are taken at central level. This may be due to many reasons,

including non-availability of the required expertise at the intermediate and peripheral levels. With greater involvement of the health services in antimalaria activities and with appropriate training, some decision-making capabilities could be decentralized in order to ensure a rapid response to problems.

6.1.5. In some countries of the Region, total coverage of the population by malaria control programmes has not been achieved. It is felt that the facilities for timely diagnosis and treatment must be extended to the entire population on a priority basis. In addition, through community participation, transmission control measures should be implemented, especially in areas of high endemicity and drug resistance.

6.1.6. It is felt that the redistribution of manpower in accordance with epidemiological needs may present difficulties in some of the countries. This problem can be solved through retraining of malaria staff in other skills. At the same time, staff of the primary health care system could be trained in different aspects of malaria control.

6.1.7. The various components of the classical surveillance system should be reviewed in accordance with epidemiological needs of malaria control; their cost-effectiveness must be taken into consideration.

6.1.8. Reliance on insecticides should be reduced, ensuring a more judicious use of them and exploring the possibility of utilizing alternative means of malaria control, such as biological and other source-reduction methods.

6.1.9. Promotion of personnel and community protection from malaria and community participation in other antimalaria activities.

6.1.10. Guidance on how to implement the process of stratification. As stated above, countries of the Region can be classified into three main categories:

- (a) endemic countries with nationwide malaria control programmes
- (b) endemic countries without nationwide malaria control programmes
- (c) countries free from malaria.

The epidemiological situation shows great variation in different parts of each country. Therefore, stratification of each country is necessary for proper allocation of resources and the selection of appropriate control measures. This stratification should be based on the existing and potential malaria situation, vector species, parasite formula, the current status of antimalaria services, development of the primary health care system, the socio-economic status of the population and the availability of human and material resources. All concerned, e.g. agriculture, irrigation, forestry, education, etc., and recognized leaders of the community should be involved in providing the necessary information for the stratification process, for the success of which all staff concerned at district, provincial and national levels should be suitably trained.

6.1.11. Guidance on how to develop programme objectives for each stratum. Once stratification of the country has been completed it will be easier to set the objectives for each stratum. The objectives should be in line with the overall development strategy of the country. Intersectoral collaboration and the involvement of the community at every level would be highly

desirable, in setting the objectives, which could vary from total coverage of population for diagnosis and treatment only, through reduction of transmission and epidemic forecasting to control or maintenance of a stratum free from malaria.

6.1.12. Selection of control measures and approaches. The selection of control measures should aim at the attainment of set objectives in each stratum. In addition, community acceptance, cost-effectiveness and availability of resources should also be considered in the selection of control measures which will yield permanent results. Community participation in selection and implementation of control measures should always be sought.

6.1.13. Redistribution of manpower, material and financial resources. It is realized that the implementation of the above steps will require redistribution of manpower and financial resources which may not be always feasible. Some of the administrative problems may have to be overcome by tactful persuasion. Health education of the community and retraining of staff in the needed skills may further accelerate the implementation of the above measures.

## 6.2. Training

Since the malaria situation is deteriorating in some countries of the Region and taking into consideration the adoption of the new philosophy of the primary health care system, it seems reasonable as well as economical to implement malaria measures within primary health care, this will be a new strategic approach.

To put this into action, it is important that health services personnel at all levels should receive pre-service/in-service training relevant to their future role in diagnosis, treatment and other antimalaria activities.

Before integrating malaria control activities into PHC it should be necessary to consider the framework of the different components of the health services which, in most developing countries, usually consist of three levels, as follows:

### 6.2.1. Peripheral level

This consists of village, sub-centre and primary health centre. In the village, the community health workers, usually volunteers, e.g. school teachers, religious leaders, midwives and others, are carrying out detection of fever cases, giving antimalarial treatment, following treated cases, reporting information, promoting environmental control measures and carrying out health education activities.

The above mentioned categories should obtain training in detection of fever cases, reporting information, health education and environmental control measures. The different categories of health centre staff should receive training as follows:

(a) Doctors should be trained in the treatment of drug-resistant cases and the management of severe and complicated malaria. They should also be trained in malaria epidemiology and in the application of malaria control measures.



(b) Sanitarians and health inspectors should be trained in basic malaria epidemiology, entomology, geographical reconnaissance, spraying and larviciding operations, environmental control measures, recording and reporting and health education.

(c) Laboratory technicians should be trained basically in the detection of malaria parasites.

(d) Other health personnel should receive training in collection of blood films, treatment and health education.

#### 6.2.2. *Intermediate level*

This level is usually located either in a district or province and staffed by a qualified doctor, preferably an epidemiologist, and assisted by an entomologist, a sanitarian, a health educator and a statistician. Their functions are: implementation, supervision, guidance, monitoring, evaluation and arranging training courses for lower-level staff as well as taking care of epidemics. The intermediate level staff should be trained at higher specialized training centres, at national and international levels, according to their speciality.

#### 6.2.3. *Central level*

This level is headed by the Director-General and staffed by:

- an epidemiologist
- an entomologist
- a senior parasitologist
- a senior sanitarian
- a senior health educator.

Their functions consist of planning, supervision, evaluation, training, logistics, research and providing technical guidance.

#### 6.3. *Prevention and treatment of malaria*

6.3.1. It is necessary to provide community health workers with sufficient antimalaria drugs for the prompt treatment of malaria cases.

6.3.2. Facilities for malaria diagnosis should be made available at peripheral level.

6.3.3. Training and guidance of health services personnel at all levels in the recognition and treatment of malaria cases, especially severe and complicated malaria, should be vigorously pursued and all diagnostic and treatment facilities be provided, especially to peripheral level centres.

6.3.4. Particular attention should be paid to drug-resistance malaria cases and their detection, monitoring and management.

6.3.5. The capacity at the periphery to detect and respond to drug resistance should be supported by regular monitoring of parasite susceptibility by trained personnel from higher levels.

6.3.6. In areas where resistant strains of *P. falciparum* exist, particular attention should be paid to detect possible adverse effects of the alternative drug combination, sulfadoxin and pyrimethamine.

6.3.7. The use of mefloquine and its combination should be restricted to the treatment of slide-positive *P. falciparum* cases likely to be resistant to standard antimalarials; it should be administered at the referral level of the health care system.

6.3.8. Effective health education should be encouraged through radio, television, audio-visual aids and the involvement of the community through voluntary collaboration, school teachers and religious leaders.

6.3.9. An efficient and active monitoring and reporting system should be developed and strengthened to enable rapid reporting and analysis of information to enable the necessary action to be taken immediately. It is felt that it is time to change the present malaria forms into new standardized forms which can be computerized. The assistance of WHO at this stage is requested.

#### 6.4. Malaria transmission control

To ensure the success of the combat against malaria, it is necessary to gain the confidence of the people and stimulate their willingness to derive benefit from the primary health care services.

6.4.1. The special circumstances concerning control measures in high-risk areas, e.g. refugee camps and among special categories of workers, should be kept in mind.

The control measures will comprise:

- (a) Ensuring the siting of the camps in a non-malarious or low-malarious area, as far as possible.
- (b) Screening and treating refugees and workers on their first arrival.
- (c) Reserving insecticide spraying for clearly defined situations. Spraying should be based on careful epidemiological and entomological studies.

6.4.2. In order to forecast epidemics, it is important to analyse the available epidemiological and entomological information as well as meteorological data, together with other information such as population movements, particularly of immigrants and refugees. The possible effect of new irrigation and development projects should also be taken into account, so that control measures can be prepared in advance and be implemented in time to prevent the expected increase in malaria morbidity and mortality. If there is an abnormal increase of reporting of malaria cases from the periphery, denoting the beginning of an epidemic, mass drug administration and radical treatment should be administered and vector control measures should be applied, if feasible.

### 7. RESEARCH AND DEVELOPMENT

#### 7.1. Acquisition and documentation of experience

The Eighteenth WHO Expert Committee on Malaria noted the difficulties experienced in trying to reorient malaria control and the variability of malaria epidemiology; it emphasized the need to improve the understanding of

local epidemiological determinants as well as the conditions of applicability of antimalaria methods. Therefore, guidance should be provided based on well-documented experiences, not only of the effects that have followed malaria control interventions, but also of the conditions under which similar effects may be expected.

Experience indicates that what is needed in order to improve malaria control, even more than the development of new and improved methodology, is a better understanding of where and how to apply general knowledge already available. This implies that the acquisition of experience in the Eastern Mediterranean Region should concentrate on:

- (a) an appropriate review of the malaria problem in terms relevant to its control within primary health care and the feasibility of maintaining that control, with particular attention to the social, economic and ecological factors effecting transmission;
- (b) the identification of technologies appropriate for application by the health system infrastructure;
- (c) the definition of the levels of primary health care infrastructure at which control, supportive and referral functions should be established, including the deployment of drugs for first-line treatment and the management of treatment failures;
- (d) the provision or development of monitoring and information systems necessary for the appropriate functioning of malaria control;
- (e) health services research to determine the stage of development of the basic health services and to determine how, where and when to phase antimalaria activities;
- (f) the identification of the conditions under which specialized services, such as vector control teams, should be established for the control of epidemics or for the control of malaria transmission in areas where the intensity of the problem and the level of development of health services require such activities;
- (g) conditions under which the withdrawal of regular residual insecticide house-spraying could be safely undertaken.

## 7.2. Promotion and implementation

Such documentation of experience constitutes the main component of the research and development approach and does not necessarily require formal research protocols or a period of baseline information collection; rather it should be carried out as part of the control programme, with careful design, observation, evaluation and documentation. In effect, this constitutes one aspect of monitoring the malaria control operations.

During the course of implementing malaria control approaches, relevant (operational, technical, etc.) problems will be identified at various levels. These problems and the need for their solution should be brought to the attention of the appropriate epidemiological group who will determine whether the means are available locally, within the area of responsibility of the epidemiological group, or whether the matter will have to be referred to a higher level of the health system or an appropriate institution. Some of these problems may need to be solved through well-structured, applied field research, carried out in close collaboration with departments or institutions with the necessary technical capability. On the other hand, some problems could be studied through the research and development approach by the health

services personnel under the expert guidance and assistance of an epidemiologist.

### 7.3. The utilization of research results

The above mechanism for the identification of problems, and the implementation of studies to find solutions to them, will provide the best means of ensuring that results will be fed back into the management process and appropriately utilized. When the problem has been referred to departments or institutions to carry out research, the local health staff where the problem has been identified should be kept informed and, if possible, involved in the research to ensure that the results will indeed be fed back.

### 7.4. Research as a training resource

The completed documentation of applied field research and research and development studies should be used as case studies for training of various health personnel, including university undergraduates and others.

The undertaking of such research offers the opportunity for the training of different categories of health staff during its implementation. Furthermore, it may provide the possibility of training personnel from outside the area in different approaches to malaria control or in specific techniques.

## 8. CONCLUSIONS AND RECOMMENDATIONS

8.1. The countries of the Eastern Mediterranean Region differ widely in population size, socio-economic development, malarigenous potential and development of primary health care as well as in their antimalaria services. Despite these differences, concerted action is required to control malaria in a more effective manner. The following steps are of vital importance:

- (a) Countries that have not yet reviewed their programmes to implement antimalaria action within the concept of primary health care should do so as a priority.
- (b) Countries in the process of revising their programmes should accelerate this process even more rapidly towards full implementation.
- (c) All countries, irrespective of the stage of implementation, should immediately ensure total coverage of diagnosis and treatment of malaria throughout their malaria-endemic areas as a priority.

8.2. In general, antimalaria action should be delivered by developing primary health care systems; however, care should be taken to ensure that the health system can adequately deliver the necessary services without impairing the degree of malaria control already achieved. Malaria control services could form the basis of a PHC system in areas where it is the only functioning service.

8.3. To reduce mortality and suffering from malaria, prompt diagnosis and treatment are essential. Countries should ensure that community health workers can diagnose malaria clinically, that they are kept constantly supplied with antimalaria drugs and that there is an effective referral system for severe cases and treatment failures. In addition, facilities for microscopical diagnosis of malaria should be made available at the peripheral

level, with due care given to preventing the transmission of hepatitis and other viral infections, by utilizing disposable lancets and disposing of them after use in a correct manner. Such a peripheral diagnostic capability is particularly important in areas of *P. falciparum* resistance.

8.4. Countries need to find appropriate ways in which to transfer responsibilities for malaria control to the basic health services for delivery within primary health care systems. In pursuance of this, health systems research will be necessary to determine the stage of development of the health system concerned and how, where and when to phase antimalaria activities.

8.5. Problems requiring study at the periphery should be identified. Some problems can be studied through a research and development approach conducted by health workers and the expert multi-disciplinary guidance of the epidemiology group at the intermediate level. The results of such an approach will invariably be fed back into the management process. Problems beyond the capabilities of the epidemiology group should be referred to the centre or an appropriate institution where, with guidance from the relevant appropriate special bodies, research would be considered for implementation. The results of research carried out at the higher level should be sent back to the epidemiology group to ensure application at the periphery.

8.6. To implement the research and development approach, epidemiologists or other professionals will need to be suitably trained in research methodology. To encourage professionals to take up this work and also remain in service, governments should allocate sufficient funds for research activities and provide incentives and career opportunities.

8.7. The malaria situation is deteriorating in some countries of the Region and there is shortage of qualified and experienced staff for long-term maintenance of the programmes already developed. To ensure the implementation of the epidemiological approach in malaria control within primary health care, countries should:

- (a) develop a cadre of expertise at the central and, if possible and appropriate, at provincial levels, for proper planning and epidemiological (including entomological) guidance. Countries without such a core group should develop one without further loss of time and those already with a nucleus of expertise should strengthen it;
- (b) develop or strengthen and extend training capabilities at different levels of the primary health care system;
- (c) develop suitable working manuals and training materials to guide the various categories of workers in the control of malaria within their areas of expertise and responsibilities;
- (d) pay attention to educational curricula in health training institutions, universities and schools to incorporate relevant aspects of the malaria problem and its control, and especially to train staff in the management of severe and complicated malaria, the effects of drugs and toxicity reactions of insecticides.
- (e) improve the career structure for public health workers to attract qualified professionals and reduce the attrition rate of trained personnel.

8.8. Effective implementation of the epidemiological approach to malaria control will not be possible in the countries of the Region without the development and/or strengthening of existing epidemiological organizational structures, extending as far into the periphery as possible, to provide the necessary epidemiological and response capabilities for the rapid identification and management of problems. To achieve this, countries should:

- (a) establish epidemiological capabilities (units or groups) at appropriate levels of the primary health care system; such units or groups would also help in the process of planning and evaluation of control measures;
- (b) review the information and reporting systems with a view to eliminating unnecessary, unused information and complicated forms for reporting, and strengthen such systems so as to provide the needed information rapidly to the appropriate levels, thus permitting an early analysis of the situation and rapid response to emerging problems, especially epidemics so that they may be contained;
- (c) develop a simple, but effective, monitoring system for the detection of drug resistance in malaria parasites, based on a careful follow-up of treated patients and reporting of treatment failures, *in vivo* confirmation by trained medical staff and *in vitro* measurement of parasite response by an expert team;
- (d) develop a monitoring system for reporting of drug reaction and toxicity to insecticides;
- (e) develop the capability to detect insecticide resistance in vectors in those areas where insecticides are being used or intended to be used for transmission control and where response to these control measures indicates it.

8.9. Health education for the public has been practised for years but with very little signs of success as far as malaria prevention and control are concerned. As responsibility for antimalaria action is transferred to the health services for implementation within the strategy of primary health care, under the expert guidance of malariologists, the individual and the community will need to be made aware of the malaria problem, to understand more and to take a greater responsibility for their own health and that of the family.

It will be essential for countries to develop appropriate and innovative forms of health education relevant to their needs. All the media should be utilized and appropriate health messages promoted. Modern means of communication should not be overlooked taking into account the practices of the younger generation. Innovative forms of health education should be directed toward the entire population through the family and community leaders.

8.10. To facilitate the implementation of the above recommendations the World Health Organization is requested to:

- (a) contribute to the development of a standardized form of reporting applicable to the countries of the Region, bearing in mind the possibility of using electronic data processing in future;
- (b) disseminate to health services personnel at country level information on research being carried out on malaria and the results of completed research, as well as relevant WHO reports and publications;
- (c) provide technical collaboration for the development of materials for innovative approaches to health education for the promotion of malaria control.

8.11. The report of the Eighteenth WHO Expert Committee on Malaria stated that "vector control is still and will remain for some time one of the primary weapons to control malaria in many endemic countries. The use of insecticides still remains the most practical and widely used method for malaria vector control".

The countries of the Eastern Mediterranean Region, while selecting methods of vector control through residual insecticides, should take note that this is an expensive method which is likely to pollute the environment and that the gains involved are, with few exceptions, temporary in nature. Nevertheless, selective residual spraying with insecticides in areas of high endemicity is probably the most effective method of reducing malaria transmission.

Insecticide application should be done on a selective basis after careful epidemiological and entomological evaluation. Strict attention must be paid to the safe use of pesticides. Source reduction and vector control by environmental and biological methods should also be practised where justified.

In countries where epidemic situations may arise, the use of appropriate insecticides is considered as an essential component of the control approach. This will require the capability to rapidly mobilize the necessary amounts of insecticides and manpower.

8.12. The malaria situation in countries of the Region requires immediate and carefully selected antimalaria measures to be implemented in high-priority areas and population groups, such as among special categories of workers and in refugee camps. In new development projects intersectoral coordination will be essential to ensure that the health services are fully informed of such projects, are involved in planning from the health point of view and give expert guidance on the prevention and control of malaria among such workers and resettled populations.

ANNEX 1

AGENDA

1. Registration
2. Opening ceremony
3. Malaria situation in the Eastern Mediterranean Region and Regional Programme.
4. Case studies on malaria control within primary health care.
5. Global strategy of malaria control within primary health care.
6. Working groups:
  - I. Epidemiology of malaria
  - II. Organization and management of malaria control in the context of primary health care and manpower development.
  - III. Malaria research.
7. Presentation and discussions of working groups' work.
8. Recommendations
9. Closing session



ANNEX 2

PROGRAMME

Saturday, 27 June 1987

- 08.00 - 09.00 Registration
- 09.00 - 10.00 Opening Session
- Message from Dr Hussein A. Gezairy, Director, WHO Eastern Mediterranean Region
  - Introductory comments: Dr J.A. Najera-Morrondo, Director, Malaria Action Programme, WHO Geneva
  - Welcome speech by H.E. the Minister of Health Dr Zeid Hamzeh
  - Election of Chairman, Dr M.K. Tawfik (Jordan), Vice-Chairman and Rapporteur Dr I. Shah (Pakistan)
- 10.00 - 10.30 Coffee Break
- 10.30 - 11.00
- Adoption of Agenda and Provisional Programme of Work
  - Constitution of the working groups
- 11.00 - 12.30 An analysis of the malaria situation, approaches and progress in malaria control in countries of the Eastern Mediterranean Region (Dr G.A. Farid)
- 12.30 - 14.00 Lunch Break
- 14.00 - 17.00 Case studies on the implementation of anti-malaria activities within developing primary health care systems
- Pakistan (Dr I. Shah)
  - Sudan (BNHP) (Dr A. El-Gaddal)
  - Jordan (Dr M.R. Tawfik)

Sunday, 28 June 1987

- 08.30 - 12.00 Introduction to the global policy for malaria control and the recommendations of the Eighteenth WHO Expert Committee on Malaria (Dr J. Najera-Morrondo and STC)  
(with coffee break from 10.00 - 10.30)
- 12.00 - 12.30 Regional and National Control Strategies (Dr G. Farid)
- 12.30 - 14.00 Lunch Break
- 14.00 - 14.30 Malaria diagnosis and treatment in the Region (Dr G. Farid)
- 14.30 - 15.30 Transmission control and programme management (Dr P. Beales)
- 15.30 - 16.00 Coffee Break
- 16.00 - 17.00 First meeting of the working groups

Monday, 29 June 1987

08.30 - 17.00 Second Meeting of the Working Groups  
(Coffee and  
Lunch breaks  
included)

Tuesday, 30 June 1987

08.30 - 10.00 Plenary session report of progress made by the working  
groups and discussions  
10.00 - 10.30 Coffee Break  
10.30 - 17.00 Third meeting of the working groups  
(Lunch and  
Coffee Breaks  
included)

Wednesday, 1 July 1987

08.30 - 10.00 Presentation and discussions of Group I  
draft report and recommendations  
10.00 - 10.30 Coffee Break  
10.30 - 12.30 Presentation and discussions of Group II  
draft report and recommendations  
12.30 - 14.00 Lunch Break  
14.00 - 15.30 Presentation and discussions of Group III  
draft report and recommendations  
15.30 - 16.00 Coffee Break  
16.00 - 17.00 General discussions

Thursday, 2 July 1987

08.30 - 10.00 Presentation, discussions and adoption of final  
recommendations of the meeting  
10.00 - 10.30 Coffee Break  
10.30 - 12.30 Continuation of discussions and final recommendations  
12.30 - 14.00 Lunch Break  
14.00 - 16.00 Closing session: Adoption of the report and recommendations.

ANNEX 3

LIST OF PARTICIPANTS

AFGHANISTAN	Dr A. Karimzad President Malaria and Leishmaniasis Institute <u>Kabul</u>
EGYPT	Dr M.A. El Alami ex-Director Malaria Training Centre <u>Kalioub</u>
IRAQ	Dr N.A. Ali Director Endemic Disease Institute <u>Baqhdad</u>
JORDAN	Dr M.R. Tawfik (Chairman) Director Malaria and Bilharzia Department Ministry of Health <u>Amman</u>
PAKISTAN	Dr I.H. Shah (Vice-Chairman and Rapporteur) Director Malaria Department Ministry of Health, Special Education and Social Welfare <u>Islamabad</u>
SOMALIA	Dr A.Y. Alio Director, Planning and Training Ministry of Health <u>Moqadishu</u>
SUDAN	Dr A.A. El Gaddal Manager Blue Nile Health Project <u>Wad Medani</u>
SYRIAN ARAB REPUBLIC	Dr A. Budeir Director Communicable and Endemic Disease Department Ministry of Health <u>Damascus</u>

WHO SECRETARIAT

Dr J.A. Najera-Morrondo	Director, Malaria Action Programme	WHO Geneva
Dr G.A. Farid	Regional Malaria Adviser and Secretary to the Meeting	WHO Eastern Mediterranean Regional Office
Dr P.F. Beales	Chief, Malaria Action Programme, Programming and Training	WHO Geneva
Dr K. Afridi	WHO Malariologist	Malaria Project Saudi Arabia
Dr H. Rathor	WHO Consultant Vector Biology and Control	WHO Eastern Mediterranean Regional Office
Dr J. de Zulueta	WHO Temporary Adviser	Ronda, Spain
Dr K. Lassen	WHO Temporary Adviser	Saboth, Austria