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MALARIA ERADICATION PROGRAMMES IN THE EASTERN MEDITERRANEAN REGION

INTRODUCTION

Since May 1955 when the Eighth World Health Assembly adopted the principle of global malaria eradication as a goal for all anti-malaria activities, the World Health Organization, through its Regional Offices, has taken the leadership in stimulating, coordinating and providing advisory services to all the countries where eradication is known to be technically feasible. Field experience gained during this period has convinced the public health authorities of the soundness of conversion of malaria control programmes to those aimed at eradication, and has oriented the public health services to the requirements - technical, administrative and financial - that will ensure success. Without this experience and knowledge gained in undertaking such huge programmes, the principle of malaria eradication would have remained as a theory instead of becoming an established fact based on the minutest scientific and business administration details.

As referred to in the Regional Director's report, malaria eradication programmes have evolved as national programmes of high priority involving national mobilization. This has been done through diffusion of knowledge to all social levels regarding the aim of the malaria eradication programme, the health and economic gains, and the rôle of the medical profession as well as the people in their participation in this national undertaking. Thus eradication programmes have developed as an integral part of national economic development schemes of most countries of this Region and are receiving great moral support from the heads of many states. Continued stress has been given to the proper planning of such programmes based on the medico-geographic features of each country, on its public health structure and socio-economic status, and to the importance of providing the national Malaria Eradication Services with trained personnel, effective management and adequate financing. Thus both governments and international agencies contributing to these programmes have become aware of their commitments in bringing about eradication.

It should be emphasized that as in any public health undertaking with a specific goal, ambitious as that of eradicating a disease such as malaria, difficulties and problems in field operations are to be expected and, although these may have a staggering effect on some programmes, the public health authorities have never failed to face them.

So long as this objective is kept in mind, and year to year activities are adjusted, intensified and maintained, no country that has started its malaria eradication programme, will ever be discouraged by set-backs but will gain experience by them and continue to progress towards the objective. The word "failure" is not accepted in the philosophy of malaria eradication, which is based on man's will to conquer this disease, and the challenging spirit of public health men armed with the most up-to-date technical knowledge and experience, and the most effective weapons ever developed to eradicate malaria. Malaria eradication should be regarded as a biological method, the evolution of which in every country is the responsibility of the public health authorities. The World Health Organization's rôle is to put at their disposal the experience gained in other countries which have achieved eradication or are far advanced in such an undertaking, and to coordinate all their activities.

This document consists of two sections. The first is a report on the status of malaria eradication programmes in the countries of this Region based on the latest available data and describing the experience gained during the last few years. The second gives a description of the activities of the Regional Malaria Eradication Coordination Unit and its rôle in securing international collaboration, as well as in stimulating coordinating efforts among countries, in their planning, training, operational activities, and research.

I STATUS OF MALARIA ERADICATION PROGRAMMES IN THE EASTERN MEDITERRANEAN REGION

1. Extent of the Problem

The Eastern Mediterranean Region comprises twenty-four countries and territories with an area of approximately 12,918,000 sq.kms and a total population of 197,858,973 of which approximately 154,245,473 (78%) live in malarious areas. Apart from Kuwait, where malaria is not known to have existed, malaria has disappeared in Aden Colony, Cyprus, Gaza Strip, and French Somaliland, through efforts of public health workers. The total population in these areas which can be considered in the maintenance phase is estimated at 1,262,940. Malaria activities during 1959 protected a population of approximately 38,000,000, representing 25% of those exposed to

malaria risk. Eradication programmes are now being implemented in six countries, as mentioned above, with a total population of 36,610,179. Annex I, Table I shows the malaria eradication situation in each of the countries of the Region, and Table II shows the status of malaria eradication by population for the whole of the Eastern Mediterranean Region.

The malaria eradication pilot projects, and the malaria pre-eradication surveys in the different countries, have contributed enormously to our understanding of the extent of the malaria problem in this Region, and the various difficulties connected with eradication.

An unstable malaria with seasonal fluctuation exists in most of the malarious territories; periodical epidemics of a serious nature have occurred from time to time such as the one recorded in Ethiopia in the latter part of 1958, when an estimated population of 3.5 million was reported to have suffered from the disease and the death toll amounted to 100,000 persons. An epidemic outbreak in the Province of Egypt, UAR, in 1959 involved a high morbidity figure of over 94,000 cases. Nomadism, the seasonal aggregation of agricultural labourers on a large scale, the development of resistance to chlorinated hydro-carbon insecticides in certain main vectors are linked with the malaria problem in this Region.

2. General Picture

From the very beginning of WHO activities, malaria has been one of the major health problems for which Governments in this Region have received assistance from the Organization. Over the past ten years, the programmes have steadily developed from limited demonstration projects to large control programmes and eventually to country-wide eradication programmes in several countries. Malaria eradication has now been accepted by all countries in the Region as the ultimate aim.

Iran, Iraq, Israel, Jordan, Lebanon and the Province of Syria, UAR, (countries forming the northern geographical block of this Region) are now implementing eradication programmes.

Pre-eradication surveys were completed in Libya (at present undergoing eradication), the Province of Egypt, UAR, (in preparatory phase), and in Tunisia (preparatory phase). Pre-eradication surveys are progressing in Saudi Arabia and Pakistan. Pakistan's acceptance of WHO policy in converting its malaria control programme to one aimed at eradication was a highlight of 1959, especially as the biggest malaria load in this Region (80 million under risk) is involved.

The malaria eradication pilot project in the Sudan is scheduled to be terminated at the end of the year, when a pre-eradication survey will be started and a comprehensive Plan of Operation for an eradication programme developed.

The malaria eradication pilot project in Ethiopia was terminated at the end of 1959 and the project area was converted into a field training area attached to the WHO-assisted national training centre.

3. Review of Status of Malaria Eradication Programmes

As shown in Annex 1, Table I, there are six countries in the north-eastern part of the Region that are advanced in implementing malaria eradication programmes. These are Iran, Iraq, Israel, Jordan, Lebanon, and the Province of Syria, UAR. During 1960 Libya has started this eradication programme and the Province of Egypt, UAR, is now in the preparatory phase. The total population of these countries is approximately 62 million, among whom 41.5 million live under malaria risk.

In Iran, the eradication programme is proceeding by stages; in the Province of Egypt, UAR, a programme by stages will be undertaken in the future. In other countries, the eradication programmes are progressing on a total coverage basis.

In 1960, a total of 21,329,579 persons are being protected by various eradication measures (Annex I, Table I). Table II shows the year when eradication started and the year when it is expected to be completed. Comprehensive Plans of Operations superseding those that were originally agreed upon as well as new ones made for Libya and the Province of Egypt, UAR, give detailed Plans of Action for each year's operation. These new Plans of Operation are being developed on the basis of past experience and thus include all possible guarantees of success. A detailed description of the malaria eradication programme in each of the above eight countries and a presentation of the difficulties encountered and future prospects are given in Annex III. In addition, an account of the progress of eradication in the above countries and of the steps taken by the Ministries of Health to meet the requisites of such programmes limited in time and involving mobilization of a huge labour force and heavy initial expenditures, is given below.

(a) Administrative Machinery in Malaria Eradication Services

Most of these countries have realized the waste of effort and money resulting from gearing the administrative and financial machinery of a

Malaria Eradication Service to the routine procedures followed in other departments of public health. This is the reason why in all the new Plans of Operation stress is placed on the vesting of full administrative and financial powers in the Ministers of Health who can delegate them either to a Malaria Eradication Board or directly to the Director of the Malaria Eradication Service. These boards, of which the Director of the Malaria Eradication Service is a member, review periodically the progress of the programme and have full powers to recruit and to dismiss, and to provide appropriate emoluments for all categories of personnel as well as to approve the year-to-year Plan of Action and the financial commitments. While in Iran the Malaria Eradication Organization is still experiencing financial restrictions which are not contributing to a smooth-running operation, most other Malaria Eradication Services are beginning to enjoy full administrative and financial powers. In the Province of Egypt, UAR, the programme is being developed on the same pattern as that of any national development scheme, i.e. full autonomy will be delegated to a Malaria Eradication Board headed by the Minister of Health.

(b) Legislative Measures

The most important legislative measure is that required in establishing a Malaria Eradication Service and investing it with the full powers mentioned previously. Other legislative measures concerning compulsory notification of malaria cases and acceptance of eradication procedures, including treatment, are regarded by most countries as unnecessary because the existing anti-malaria or anti-epidemic laws allow for the initiation of ministerial regulations to ensure the cooperation of the medical profession, civic bodies and the public. As health education is now becoming an integral part of all malaria eradication programmes and is included in the training of the various categories of malaria eradication personnel, there is every hope that such regulations would be accepted by the public.

(c) Personnel

There is an apparent difficulty in filling certain key professional posts in many countries due to hardships involved in malaria eradication work and absence of compensatory remunerations. This is exemplified in the case of Iran where a high rate of shift-over of personnel is noted. The newly developed Plans of Operation provide the Malaria Eradication Board with powers to give adequate emoluments to retain experienced key personnel. Emphasis is also being placed on the training of malaria eradication personnel to improve their proficiency and skill. The national training centres, and the various fellowships granted by WHO to the Regional Malaria Eradication

Training Centre in Cairo and other International Training Centres, help in this respect. The provision of WHO advisers in the various fields has contributed to raising the standard of technical operations. In the eight countries undertaking eradication, there are already 20 WHO staff members (7 malariologists, 2 entomologists, 3 sanitary engineers, 3 administrative officers, 4 sanitarians, 1 technician).

(d) Spraying Operations

Residual spraying with modern insecticides is regarded as the most effective weapon in eradicating malaria. A successful operation is based on the prior establishment of geographical reconnaissance with detailed mapping including numbering of houses and huts in all villages, small hamlets, etc. The organization of the spraying team, the adequate training of spraymen and supervisory staff, together with availability of adequate transport ensure successful total coverage. Unfortunately, there are certain shortcomings in some of these programmes, mainly due to administrative and financial difficulties in recruiting and training personnel in time for the start of the spraying operation.

Owing to the seasonal nature of this operation, the loss of a great number of experienced spraymen every year and the inadequate training given to new recruits, the technique of spraying has not been up to standard in many areas. The provision of well-trained sector chiefs or supervisors and the advisory services given by WHO sanitary engineers and sanitarians attached to these programmes, are now helping to raise the standard of the supervisory services and the skill of the spraymen.

Reference is made in this connexion to recommendations 3.4.1 and 3.4.2 of the Second Regional Conference on Malaria Eradication (Annex II).

(e) Epidemiological Surveillance Activities

Experience gained in establishing an active surveillance system by the Malaria Eradication Services during the past few years has shown that this important operation takes some time to develop in order to reach maximum efficiency. For this reason recommendations are made to start active surveillance at least two years before discontinuation of spraying operations. Here again the training of surveillance agents and the provision of an operational calendar and adequate transportation, are essential to success. The national training centres are giving special courses to these surveillance agents. When work is assigned to them, each is given a certain portion of the population to cover in one month, taking into consideration the density of population in the area and the availability of good roads. It is noted

that in most countries many improvements have been made in the organization and follow-up of active surveillance through decentralization of these activities, including the laboratories charged with the examination of the blood slides collected.

In some countries the reliability of the microscopists in examining the blood specimens for malaria is questionable because of inadequate training. Experience has shown that for a microscopist to be reliable, he has to be trained for at least three months, and then have three months in-service training before he may be trusted to examine malaria slides.

It is apparent also that epidemiological investigation for every positive case is lacking in many countries, due to the shortage of epidemiologists or other well-trained field supervisors. A radical treatment of P. vivax and P. malariae cases by the administration of Primaquine over fourteen days (15 mg. tablets adult dose), following a course of Chloroquine, has not been adopted in many countries due to the lack of medical supervision and facilities for hospitalization.

There is accumulated evidence that Primaquine can be given on a domiciliary basis by field supervisors if they are made aware of a few easily detectable toxic symptoms which are indications to stop administering this drug.

The development of passive detection of cases is lacking in this Region. In view of the high cost involved in the supervision of an active surveillance system, stress is laid on developing voluntary collaborators from villages who can be easily trained to take blood specimens from suspected cases. The experiment made in Aleppo in the Province of Syria, UAR, by utilizing the services of 137 voluntary collaborators, covering a population of 303,000 deserves mention, as it shows that this system can be easily applied in other countries. It should be realized, however, that passive detection of cases by voluntary collaborators does not replace active surveillance, but increases its efficiency without involving any extra expenditure.

Reference is made, in this connexion, to recommendations 3.4.4, 3.4.5, 3.4.6, 3.4.7, 3.4.8 of the Second Regional Conference on Malaria Eradication (Annex II).

(f) Entomological Activities

The rôle of the entomologist in Malaria Eradication Services is becoming a prominent one. During the attack phase he is charged with the task of discovering any resistance on the part of the malaria vectors to any of the modern insecticides used in residual spraying programmes, and of assessing

the duration of the efficacy of insecticides sprayed on walls. During the consolidation phase, he has to contribute to the epidemiological investigations carried out on every positive malaria case, to prove whether these cases are autochthonous or not, and, together with the epidemiologist, to advise on the measures to be adopted to eliminate such residual foci of transmission.

It is fortunate that to date, the problem of resistance of vectors to insecticides, such as resistance of A. stephensi to DDT in southern Iraq and Iran, and its cross-resistance to DDT and dieldrin in so th-east Iran, and of A. sergenti to dieldrin in Jordan, is not posing a serious technical problem as it has been easily surmounted in southern Iraq and Iran by shifting to dieldrin; while in south-east Iran and Jordan resistance was discovered only in very limited areas, and, in both areas DDT is still effective.

There is an apparent lack of enthusiasm for entomological investigations on the part of certain governments undertaking eradication, especially when spraying operations have proved effective in reducing the numbers of anopheli vectors. Unless this activity is well recognized as an important tool in evaluating eradication activities certain set-backs in the progress of eradication will follow.

Reference is made to recommendations 3.4.3 of the Second Regional Conference on Malaria Eradication (Annex II).

4. Review of Status of Pre-Eradication Surveys

The success of any malaria eradication programme is based on sound planning which takes into consideration the delimitations of the malarious areas in each country, the epidemiological features of the malaria problem as well as the legislative, health education, administrative and financial requisites. The pre-eradication survey is thus becoming essential and, unless the national teams concerned in developing this activity are quite aware of all geographical, socio-economic, and public health activities of the country, the planning of the future eradication programme will be defective and will not guarantee success. It should be emphasized, that; although WHO is helping by providing advisers to guide the development of these plans, the full responsibility lies with the national public health authorities who should be made aware in advance of the technical personnel needed and the legislative and financial requirements.

The pre-eradication surveys for the Province of Egypt, UAR, and Libya were completed in 1959 and a reference to the highlights of these programmes is made in Annex III.

Saudi Arabia started its pre-eradication survey in July 1959 and to date the northern half of the country has been covered. However, the vast expanse of the country, the prevailing nomadism, the lack of macadamized roads, proper census data, detailed and up-to-date geographical maps, are hampering the progress of the pre-eradication survey. On the other hand, the malaria problem seems to be limited to the scattered oases which are separated by vast arid deserts and act as natural barriers, thus contributing to the development of a malaria eradication programme by stages without any significant risk of re-introduction of the disease. The feasibility of eradication in such oases has already been demonstrated in the eastern province of Saudi Arabia. The Government, in the meantime, is actively developing its anti-malaria service, establishing new malaria stations and staffing them with key personnel who have been trained at the Regional Malaria Eradication Training Centre in Cairo.

The pre-eradication survey activities in both East and West Pakistan have been under way since September 1959. WHO has already provided two teams, one for each wing headed by a coordinator, together with some transport and supplies. The Government has established a number of survey teams to help in surveying representative areas in each district of the country. Meanwhile, an active training programme is being developed and fellowships have been awarded, for training abroad, to senior personnel who will help in the development of the national training centres in Lahore and Dacca. WHO will provide advisers, transport, supplies and equipment for these centres.

Field training areas in both East and West Pakistan, where in each wing a population of 0.25 million will be involved, and where eradication measures will be applied, will afford training facilities for the national staff. The keen interest of the Government in developing the Plan of Operation and in taking steps to prepare the ground for future implementation of this huge programme, involving 80 million population under malaria risk, is welcomed by both WHO and US-ICA, who have pledged to support this programme.

It is expected that the Plan of Operation will be completed by the end of 1960. This will be followed by a one-year preparatory phase.

The pre-eradication survey in Tunisia started mid-1958 and the comprehensive Plan of Operation, which has been developed, is under negotiation. UNICEF has pledged its support to this programme. WHO provided a full pre-eradication survey team which, together with the national authorities, has

now completed the Plan of Operation for eradication by stages covering a population of 2 million under malaria risk. Due to certain local circumstances, especially those related to the problem of Algerian refugees, and the financial limitations of the Government, the eradication programme is planned for a duration of fifteen years which may be shortened if these problems can be settled in the meantime. The high standard of living among the rural population of Tunisia, the existence of dispensaries all over the country, the availability of an excellent net-work of roads, and the effective surveillance system carried out by the "infirmiers itinérants", as well as the scarcity of breeding places of malaria vectors in the country, are favourable signs that a successful malaria eradication programme can be achieved.

5. Review of Status of Malaria Eradication Pilot Projects

The countries with pilot malaria eradication projects, including Sudan, Ethiopia and Somalia all share in having A. gambiae as the main malaria vector. The areas of the pilot projects in these three countries differ greatly in their geographical features. The one in Sudan, lying in the Fung area in the Blue Nile Province, represents a plateau subjected to annual floods. The one in Ethiopia, the Hawash Valley, lies in a mountainous plateau at an altitude of 900m. above sea level; while the one in Somalia is situated in an arid area traversed by two small rivers (Uebi-Schebelli and Juba) where most of the settled population exists.

The pilot malaria eradication projects established since 1957 in both Ethiopia and Sudan have the objective of demonstrating the technical feasibility of malaria eradication in these countries under epidemiological and other circumstances. Both projects contributed in collecting very valuable data on the difficulties encountered. These are mostly related to the shifting nature of the population and in assuring total coverage due to the shortage of trained personnel, the non-availability of good roads, and sometimes the absence of water for formulating the insecticide on the spot. Ways and means are being found to surmount most of these difficulties, and overall experience has shown that malaria transmission can be easily interrupted by residual spraying with DDT in one or more rounds per year. The US-ICA pilot project developed in three other areas in Ethiopia corroborated these findings.

In the case of Sudan, the WHO-assisted project has protected a population of almost 500,000 through residual spraying, and is establishing a surveillance system on 225,000 persons who have already been protected for three successive years. If malaria eradication activities are maintained in this pilot project, the whole area can go into the consolidation phase in 1962, thus forming a

sizeable first stage area in the future malaria eradication programme. A pre-eradication survey is now being negotiated with the Government, which has already undertaken to provide $22,975 in its fiscal year 1960-61 budget for the pre-eradication survey starting early 1961, and has promised the establishment of the Malaria Eradication Service in the Ministry of Health, providing it with a director and adequate staff.

In the case of Ethiopia, the establishment by an Imperial Decree of a Malaria Eradication Service with administrative and financial powers, has contributed to the intensification of anti-malaria activities within the country. The WHO-assisted Training Centre is contributing by training personnel to staff the peripheral units. Due to the vast expanse of the country, and the absence of fully developed provincial health services, stress is being laid at this stage on strengthening and expanding public health activities, including malaria control. The peripheral malaria units will also contribute by collecting data on the distribution and the epidemiological features of malaria, as well as consolidating the gains achieved in the pilot projects and expanding these to form sizeable areas where eradication measures can be maintained.

The US-ICA is also participating in the technical direction of these activities and is giving financial support to this programme.

In Somalia the anti-malaria activities, assisted by UNICEF during 1959 protected 230,000 persons which represents the settled population of the country. A WHO entomologist helped in investigating entomological problems connected with A. gambiae. Unfortunately 1959 spraying operations were limited as a large number of people were unwilling to have their premises sprayed with DDT owing to the increasing bed-bug problem and the inefficacy of DDT to eliminate it. Moreover, nomadism which involves almost two-thirds of the population of Somalia proved to be a major problem requiring careful study before a malaria eradication programme could be launched. As there is no experienced technical staff available to evaluate the effect of DDT spraying in stopping malaria transmission, the need is felt to strenthen the WHO advisory services and to boost a training programme through fellowships. Thus lately it has been decided to provide a WHO team consisting of a malariologist, an entomologist and a sanitarian to establish malaria pilot studies in three different areas representative of the malaria problem in the country.

It is hoped that the results of these studies will enlighten both the Government and the international agencies as to whether malaria eradication

would be feasible and if so a comprehensive Plan of Operation for the future malaria eradication programme can then be developed.

6. Review of Status of limited Malaria Control Activities

The Regional Office has only limited information on the epidemiological features and extent of the malaria problem in Yemen, Aden Protectorate and Bahrein. However, visits arranged by this office have stimulated the authorities to take an interest in the WHO policy of malaria eradication and to use the facilities offered by the Regional Training Centre for training some of the field supervisors. It is gratifying to note that the Yemenite delegate to the meeting in Cairo of the Health Committee of the League of Arab States requested WHO assistance in assessing the malaria problem of his country and already steps are being taken to conduct a survey this year. Some fellowships to the Regional Training Centre are also being granted.

In Bahrein, according to recent information, during October and November 1959, 5% of the population contracted malaria and three deaths occurred. This happened after four years of relative freedom from malaria and in spite of the malaria control activities undertaken by the health authorities. This shows clearly the ineffectiveness and uneconomical approach of continuing malaria control without aiming at eradication. It is hoped that the authorities will be stimulated by the example of Cyprus and decide to eradicate the disease from this small island which lies between three countries where eradication programmes are in progress, namely, Iran, Iraq, and Saudi Arabia.

In Aden Protectorate, control of malaria is mainly through residual spraying of houses with BHC w.p. one to four times yearly as found necessary. Epidemics occur and are usually brought to a rapid close by the use of mobile sanitation units which take over the task of control activities combined with mass drug therapy. The authorities intend to initiate a campaign for the eradication of malaria based on the polyvalent staff of the health centres and on the mobile sanitation units.

It should be emphasized that unless a detailed Plan of Operation is developed with a service devoted exclusively to malaria eradication, there will be little chance of success. Investigations carried out in 1957 showed no evidence of resistance of the vectors A. gambiae and A. sergenti to BHC. Due to the frequent application of this insecticide and the known occurrence of resistance in both these vectors to dieldrin (which is in the same group as BHC) in other countries both in this Region and in the African

Region, it is feared that the indiscriminate use of this insecticide, unless geared to an eradication programme limited in time, will ultimately induce resistance in these vectors.

II COORDINATION ACTIVITIES

The Malaria Eradication Coordination Unit (MECU) in the Regional Office now has its full complement of staff. It is supervised by a Public Health Administrator who works directly under the Regional Director and is assisted by five Regional Advisers in various fields, namely, epidemiology, engineering, entomology, programming and administrative methods. This staff, together with WHO field personnel (thirty-nine in number) consisting of malariologists, entomologists, sanitary engineers, technicians and administrative officers, forms an advisory body to governments in implementing malaria eradication programmes. Technical guidance and advice areprovided in planning, in operational activities, epidemiological assessment and administrative procedures as well as in training activities at both country and regional levels. The Unit in the Regional Office also stimulates and coordinates research work on certain technical problems such as nomadism, resistance of vectors to insecticides, radical treatment of malaria and evaluation of spraying equipment. Its rôle in disseminating technical information on the progress of malaria eradication and in stimulating governments to standardize their reporting systems is well illustrated in the papers which were submitted to the Second Regional Conference on Malaria Eradication.

The coordinating activities of this Unit among countries undertaking eradication has now been strengthened by the addition of an Inter-Country Evaluation Team which will operate in Iraq, Province of Syria, UAR, Lebanon, Jordan and Cyprus. Morever, the rôle of the Unit in coordinating the activities of this Office with other cooperating agencies, such as US-ICA and UNICEF, has been maintained at regional and at country level through close contact and exchange of visits. In addition, the responsibilities of the Unit have increased since the Regional Office has been delegated the authority to give technical approval to Plans of Operation developed according to the criteria agreed with the Division of Malaria Eradication Headquarters.

All these coordinative activities may be summarized as follows:

1. Second Regional Conference on Malaria Eradication.

This was held in Addis Ababa during the period 16 to 21 November 1959, and was attended by fifty malaria workers, both national and international,

from this Region. Fifty-two working papers were reviewed. These were concerned with the magnitude and features of the malaria problem in the Eastern Mediterranean Region, the planning of malaria eradication programmes, administrative and financial matters as well as technical aspects and problems. Attention is drawn to the recommendations of the Conference(1) which represent the experience gained by field workers. The final report has been given wide distribution.

2. Coordination activities between neighbouring countries

An agreement was reached between Sudan and Ethiopia during March 1960 to provide for exchange of visits of Directors of National Malaria Eradication Services to review the progress of work in each country, and the anti-malaria measures undertaken along the common frontiers.

Exchange of information regarding the A. stephensi problem of Iran and South Iraq as well as between the USSR and Northern Iran is being stimulated by this Office with a view to establishing more coordinative efforts in the malaria eradication activities of these neighbouring countries.

Meetings have also been held between malaria eradication personnel of Jordan and the Province of Syria, UAR, and coordination of eradication activities in timing and operational methods in the frontier areas through periodical meetings in May and September was agreed upon.

3. Inter-Regional Coordination

The development of malaria eradication programmes in the North African countries which belong to different WHO and UNICEF Regions has necessitated close coordination of these programmes between the national Malaria Eradication Services as well as between the Regional Offices of these two international agencies. This was a subject for discussion at the European Conference on Malaria Eradication held in Palermo between 31 March and 9 April 1960. A recommendation was made to further the coordination of such programmes in North Africa by holding annual meetings among the Directors of the Malaria Eradication Services of the countries in that area and of the respective Regional Malaria Advisers.

The WHO Regional Office for Africa was invited to send representatives to the Second Regional Conference on Malaria Eradication in Addis Ababa, and a paper was submitted by the Senior Regional Malaria Adviser - African Regional Office reviewing the progress of work in the African Region, the difficulties encountered, and the future policy.

(1)See: Annex II

Early this year, coordination was established between Somalia (Eastern Mediterranean Region)and British Somaliland (African Region) to permit exchange of visits of WHO and national teams for scientific purposes.

With the imminent development of malaria eradication programmes in Ethiopia, Somalia and Sudan, which adjoin countries of the WHO African Region, and the Pakistan programme adjoining India and Afghanistan of the WHO South-East Asia Region, there is a great need of effective coordination of malaria eradication activities along the frontiers, as well as rapid exchange of information between these countries on the progress of their programmes (See: Annex II, Recommendations 3.4.11 of the Second Regional Malaria Conference).

4. Standardization of Reporting Systems

Apart from the annual questionnaire filled in by the governments to provide data on the progress of their malaria eradication programmes, and the monthly and quarterly reports submitted by the WHO field personnel, some governments have been sending in monthly progress reports. The Regional Office has been encouraging them to provide such comprehensive information regularly, but the reports would be even more useful if they followed the standard pattern. Quarterly progress reports on surveillance activities are already being developed by most of the countries of the Region which clearly indicates their eagerness to collaborate in the malaria eradication field.

5. Coordination of Research

The Malaria Eradication Coordination Unit has played an important rôle in focussing attention on certain problems and has stimulated national Malaria Eradication Services as well as Institutes to carry out research on those requiring immediate investigation. The problem of nomadism involving a large proportion of the population of this Region is being tackled at a national level in Iran by the Institute of Malariology and Parasitology, which is still conducting this study and has already made valuable contributions (see: Annex II, recommendations 3.5.2 of the Second Regional Malaria Conference). At the international level, a WHO short-term consultant visited Ethiopia, Somalia and the Sudan early this year to study the ecology of nomadism as a prelude to further studies on this important problem in connexion with the planning of malaria eradication programmes.

The problem of resistance to modern insecticides is receiving a great deal of attention from this Office as may be seen from the data so far collected which is given in Annex I, Table IV.

As some of the malaria eradication programmes in this Region are now going into the consolidation phase, the use of Primaquine in the radical treatment of vivax and malariae cases on a domiciliary basis, is being followed up to assess its effectiveness and safety.

A WHO research grant was provided to Israel to study the ecology of A. sergenti and similar studies are being undertaken in Jordan. The Division of Malaria Eradication, Headquarters, has helped considerably by publishing the results of such studies by various research workers all over the world in WHO malaria periodicals (WHO/Mal/- MAL/Inform/- and WHO/Insecticides/- series) the WHO Bulletin, Chronicle, and Expert Malaria Committee Reports, all of which have a wide distribution.

6. Coordination of Training Activities

The development of curricula for training various categories of malaria workers, professional as well as auxiliary, has received great attention by this Office. In these curricula, stress is now being placed on the philosophy of malaria eradication, its techniques and procedures, the importance of evaluation in every phase of activity, the administrative and management procedures to be followed, and the rôle of health education and public relations in developing malaria eradication programmes. The various fellowships granted to candidates from different countries of this Region to both international and regional training centres (32 to professional personnel, 74 to auxiliary personnel) have contributed to raising the standard of malaria eradication training at national levels.

7. Malaria Eradication Evaluation Team

The Inter-Country Evaluation Team which was established early in 1960 according to the resolution adopted by the Regional Committee for the Eastern Mediterranean Region at its Ninth Session will help in standardizing the reporting system, in strengthening WHO advisory services in the development of an effective surveillance programme and its progressive evaluation, and in coordinating the anti-malaria measures along the frontiers; it will thus expedite the successful issue of these programmes.

ANNEX 1

TABLE I

PROGRESS OF MALARIA ERADICATION IN THE COUNTRIES
OF THE EASTERN MEDITERRANEAN REGION

COUNTRY	TOTAL POPULATION	NUMBER OF POPULATION UNDER MALARIA RISK	1959 Activities				1960 Activities			
			Population protected by				Population protected by			
			Spraying	Larvic.	Consolid.	Total	Spraying	Larvic.	Consolid.	Total
IRAN	20,500,000	13,000,000	5,621,500	-	4,170,000	9,791,500	6,500,000	-	5,000,000	11,500,000
IRAQ	6,500,000	4,500,000	2,750,900	-	538,748	3,289,648	2,864,000	-	1,636,000	4,500,000
ISRAEL	2,071,179	2,071,179	79,859	1,285,320	706,000	2,071,179	79,859	1,285,320	706,000	2,071,179
JORDAN	1,489,000	760,500	149,000	* 153,000	470,000	760,500	200,000	* 161,000	*574,500	760,500
LEBANON	1,600,000	683,000	295,000	*5,000	388,000	683,000	120,000	* 5,000	563,000	683,000
UAR (SYRIA)	4,450,000	1,500,000	1,048,600	*20,000	302,000	1,350,600	1,167,000	*20,000	*340,000	1,500,000
			PRE-ERADICATION ACTIVITIES							
							Eradication			
LIBYA	1,340,000	31,000					31,000	*31,000	-	31,000
UAR (EGYPT)	24,000,000	18,860,000					Preparatory phase 283,900	-	-	283,900

* This includes part of the population in the attack phase.

TABLE II

STATUS AND DEVELOPMENT OF MALARIA PROGRAMMES IN COUNTRIES OF THE EASTERN MEDITERRANEAN REGION - YEAR 1959

	Country or territory	Total No. of Population	No. of Population under malaria risk	No. of Population protected by all methods	Eradication		
					Date of		Type
					Commencement of attack	Completion of Consolidation	
Eradication	IRAN	20,500,000	13,000,000	9,791,500	1957	1968	By stages
	IRAQ	6,500,000	4,500,000	3,289,648	1957	1965	Country wide
	ISRAEL	2,071,179	2,071,179	2,071,179	1950	1963	Country wide
	JORDAN	1,489,000	760,500	760,500	1959	1965	Country wide
	LEBANON	1,600,000	683,000	683,000	1956	1963	Country wide
	UAR (SYRIA)	4,450,000	1,500,000	1,350,600	1956	1965	Country wide
Pre-Eradication	LIBYA	1,340,000	31,000	20,000	1961	1963	Country wide
	PAKISTAN	85,635,000	80,000,000	5,500,000	1961	1975	By stages
	S.ARABIA	7,000,000	5,000,000	522,300	1962	1972	By stages
	SOMALIA	1,300,000	1,096,000	230,000	1961	1968	By stages
	TUNISIA	3,783,000	2,000,000	2,000,000	1961	1971	By stages
	UAR (EGYPT)	24,000,000	18,860,000	9,333,253	1961	1971	By stages
Pilot	ETHIOPIA	20,000,000	8,000,000	267,618	1963	1983	By stages
	SUDAN	11,390,000	11,390,000	498,763	1962	1972	By stages
Limited control	ADEN	800,000	660,000	100,000			
	BAHREIN	137,853	137,853	137,853			
	QATAR	40,000	?	?			
	TRUC. STATES	60,000	?	?			
	YEMEN	4,500,000	3,500,000	-			
Eradicated normally free	ADEN COLONY	138,441	138,441	138,441	Malaria eradicated since 1950		
	CYPRUS	550,000	550,000	550,000	Malaria eradicated since 1949		
	FR.SOMAL.	67,500	67,500	67,500	Malaria eradicated since 1957		
	GAZA Strip	300,000	300,000	300,000	Malaria eradicated since 1954		

TABLE III

STATUS OF SPRAYING OPERATIONS IN THE EASTERN MEDITERRANEAN COUNTRIES

Type of Project	Country	No. of Squads		No. of Vehicles used (all kinds)	No. of Population Protected by		Insecticides (Spraying)			Total Amount Kgs.	Larvicides	
		Spray	Larv.		Spray	Larv.	TYPE	Formula	Wall Dosage in G/M2		Name	Amount by litres
ERADICATION	IRAN	385	-	385	5,621,500	-	DDT Diel. BHC BHC	75% W 50% W 25% 50%	2 0.5 0.2-0.5 0.2-0.5	944,050 133,930 1,200 578	-	-
	IRAQ	483	-	147	2,750,900	-	DDT Diel. Diel.	75% W 50% W 18.2% e	2 0.6 0.6	561,281 100,626 6,538	-	-
	ISRAEL	3	25	17	79,859	1,285,320	DDT	5% sol. in ker.	2	5,363	Malariol. Solar	287,829 153,339
	JORDAN	20	17	10	149,000	153,000	DDT DDT	75% W 100%	2 2	28,544 5,576	Solar oil with 2.5% pine resin	310,003 7,750 kg.
	LEBANON	20	-	11	295,000	5,000	DDT DDT Diel.	75% W 25% e 50% W	2 2 0.39	14,833 11,080 1,917	-	-
	UAR SYRIA	91	3	44	1,048,600	20,000	DDT DDT	75% W 25% e	2 2	156,950 14,150	Paris Green	135 lbs.

TABLE III
(continued)

Type of Project	Country	No. of Squads		No. of Vehicles used (all kinds)	No. of Population Protected by		Insecticides (Spraying)			Total Amount Kgs.	Larvicides	
		Spray	Larv.		Spray	Larv.	TYPE	Formula	Wall Dosage in G/M2		Name	Amount by litres
PRE-ERADICATION	LIBYA	80		5	20,000	5,000	DDT	75% W	-	1,200	Tossits	
	PAKISTAN	62	100	8	1,450,000	?	DDT DDT	50% W 75% W	2.2	162,200	Malariol. Keros.oil	544,588 15,176
	SAUDI ARABIA	5	12	26	197,300	325,000	DDT DDT Diel. Diel.	75% W 28% e 50% W 18% e	2.75 3.54 0.87 0.72	2,298 1,425 5,647 504	K.R. Larvicide	37,400
	SOMALIA	12	-	15	230,000	-	DDT BHC	75% W 50% W	2 2	20,700 8,115	-	-
	TUNISIA	-	8	14	-	590,000	-	-	-	-	Malariol. with DDT	40,000
	UAR (EGYPT)	67	191	50	1,617,000	7,716,253	DDT DDT DDT BHC BHC	Pure 75% 50% 75% 50%	2 2	409 107,584 139,310 33,741 4,511	oil oil + DDT oil + BHC	851,735 506,050 8,908
	ETHIOPIA	44	-	39	267,618	-	DDT	75% W	2	17,850	-	-
PILOT	SUDAN	19	-	133	498,763	-	BHC DDT Diel.	65% W 75% W 50% W	0.2 2.1 0.65	364,082 691 16,400	- - -	- - -

TABLE IV

RECORD OF ADULT SUSCEPTIBILITY TESTS CARRIED OUT ON ANOPHELINE MOSQUITOES IN THE EASTERN MEDITERRANEAN REGION IN 1959

Country	Date	Area/Locality	Spray Record	DDT		% Mortality to 4% DDT 1 hr.Exp.	Dieldrin		Observer	REMARKS
				LC_{50}	LC_{100}		LC_{50}	LC_{100}		
A. PHAROENSIS										
Sudan	December	Tafro, Sennar	DLD Since 1957						Wernsdorfer	6.7% mortality (60) to 1.6% DLD for 24 hours exposure.
UAR (Egypt)	July-Sept	Field Train. Area, Giza	Unspray.but Ag.Pest Control being applied	2.5 (1952)		85.6 (708)			Zahar	19.1% mortality (96) to 4% DLD for 24 hours exposure.
	Aug.-Sept.	Qualubia (4 localities)+		2.0-2.5 (2925)		85.6-92.5 (1037)			Zahar	5-16.0% mortality (270) to 4% DLD for 24 hours exposure.
	October	Tel El Kebir, Sharkia		1.7 (586)	4.0 (158)	100			Zahar	29.3 mortality (123) to 4% DLD for 24 hours exposure.
	October	Zagazig, Sharkia		2.2 (692)		93.9 (182)			Zahar	4% mortality (127) to 4% DLD for 24 hours exposure.
	October	Kafr El Sheikh		2.1 (644)		96.3 (196)			Zahar	10.3% mortality (106) to 4% DLD for 24 hours exposure.
	October	Beheira		1.3 (2033)		99.0 (511)			Zahar	8.0% mortality (113) to 4% DLD for 24 hours exposure.
	October	Tanta, Gharbia		2.0 (163)		91.4 (81)			Gad	

TABLE IV
(cont'd)

Country	Date	Area/Locality	Spray Record	DDT LC_{50}	DDT LC_{100}	% Mortality to 4% DDT 1 hr.Exp.	Dieldrin LC_{50}	Dieldrin LC_{100}	Observer	REMARKS
A. PHAROENSIS cont'd										
UAR (Egypt)	October	Shabshir, Gharbia		2.5 (355)		93.1 (123)			Zahar	0.1% mortality (77) to 4% DLD for 24 hours exposure.
	October	Ismailia, Canal Zone		1.8 (165)		92.3 (65)			Zahar	12.5% mortality (32) to 4% DLD for 24 hours exposure.
	October	Ashmoun-Menouf		2.0 (110)		96.8 (63)			Zahar	5.5% mortality (18) to 4% DLD for 24 hours exposure.
	July-Sept	Ras El Bar Damiette		1.1 (1410)		99.5 (366)			Gad	48.7% mortality (37) to 1.6% DLD for 24 hours exp.
	August	Fayoum		1.9 (168)		95.5 (45			Gad	68% mortality (15) to 1.6% DLD for 24 hours exposure.
A. GAMBIAE										
Ethiopia	January	Sodore	DDT since 1957	0.51 (296)	2.0 (116)	100.0 (123)	0.054 (251)	0.4 (75)	Jolivet	
	Feb.	Gambella	Unsprayed	0.64 (228)	2.0 (47)	100.0 (45)	0.042 (61)	0.2 (23)	Jolivet	
	April	Wassero	DDT since 1958	0.62 (191)	2.0 (84)	100.0 (165)	0.06 (469)	0.2 (225)	Jolivet	

TABLE IV
(cont'd)

Country	Date	Area/Locality	Spray Record	DDT LC 50	DDT LC 100	% Mortality to 4% DDT 1 hr. Exp.	Dieldrin LC 50	Dieldrin LC 100	Observer	REMARKS
A. GAMBIAE cont'd										
Ethiopia	June	Ghibié	Unsprayed	0.70 (131)	2.0 (90)	98.1 (53)	0.06 (149)	0.4 (57)	Jolivet	
	June	Gruche Near Bake	Unsprayed	0.72 (57)	2.0 (16)	100.0 (34)			Jolivet	
	Sept.	Alamata	DLD & DDT	0.3 (129)	2.0 (45)	100.0 (45)	0.04 (159)	0.4 (100)	Jolivet	
	Sept.	Eritrea-Aligeder	Agr.Pest Control	0.62 (28)	2.0 (80)	100.0 (300)	0.06 (332)	0.4 (102)	Jolivet	
A. FUNESTUS										
Ethiopia	Feb.	Gambella	Unsprayed	0.54 (411)	2.0 (37)	100 (22)	0.045 (112)	0.2 (73)	Jolivet	
	August	Gambella	Unsprayed	0.72 (293)	2.0 (76)	100 (151)	0.08 (281)	0.4 (137)	Jolivet	

TABLE IV
(cont'd)

Country	Date	Area/Locality	Spray Record	DDT LC_{50}	DDT LC_{100}	% Mortality to 4% DDT 1 hr. Exp.	Dieldrin LC_{50}	Dieldrin LC_{100}	Observer	REMARKS
A. STEPHENSI										
Iran	Sept.	Baluchistan (3 localities)	4 DDT - 3 DLD	2.2 (153)		72.2 (56)			Mofidi & Staff	37.0% mortality (111) to 1.6% DLD for 24 hours exposure.
	July	Kerman (4 localities)	4 DDT - 2 DLD	1.8 (2130)		84.2 (612)			"	37.2% mortality (266) to 1.6% DLD for 24 hours exposure.
A. SERGENTI										
Jordan	Feb.-March	Fashkha	Residual larvicides twice	0.52 (198)	2.0 (5.3)				Yacoub & Mik.	9.4% mortality (53) to 4.0% DLD for 24 hours exposure.
Saudi Arabia	May			0.27 (202)	2.0 (18)		0.09	0.4 (63)	Peffly	
A. SACHAROVI										
Syria	July	Makroussa	Unsprayed	1.05 (386)	4.0 (110)		0.07 (324)	0.4 (102)	Siddons	
A. MACULIPENNIS										
Iran	July	Paludeh Tchalus	3 DDT	2.0 (738)		95.8 (235)		0.4 (272)	Mofidi et al	

TABLE V

FUNDS ALLOCATED TO ANTI-MALARIA PROGRAMMES IN DOLLARS

Type of Project	COUNTRY	1959					1960				
		Government	WHO	UNICEF	ICA	Total	Government	WHO	UNICEF	ICA	Total
ERADICATION	IRAN	2,600,000	117,104	664,000	-	3,381.104	3,129,330	124,802	968,000	-	4,222,132
	IRAQ	2,038,600	32,479	52,500	-	2,123,579	2,338,264	81,165	228,000	-	2,647,429
	ISRAEL	211,100	16,163	-	-	127,263	241,660	6,000	-	-	251,660
	JORDAN	126,015	19,955	-	69,000	214,970	140,000	43,175	19,000	172,000	374,175
	LEBANON	87,440	4,172	10,000	-	101,612	58,380	14,040	5,000	-	77,420
	UAR (SYRIA)	189,190	47,419	156,000	-	392,609	198,918	50,530	227,000	-	476,448
PRE-ERADICATION	LIBYA	-	12,576	-	103,000	115,576	-	8,700	-	70,000	78,700
	PAKISTAN	510,661	51,472	-	-	562,133	1,370,432	185,880	-	-	1,556,312
	SAUDI ARABIA	842,100	39,977	-	-	882,077	1,263,150	34,930	-	-	1,298,080
	SOMALIA	97,199	13,819	34,000	-	145,018	137,936	33,200	29,000	-	200,136
	TUNISIA	375,000	43,679	-	-	418,679	333,330	40,500	-	-	373,830
	UAR (EGYPT)	1,463,960	21,018	-	-	1,484,978	449,232	24,800	-	-	474,032
PILOT	ETHIOPIA	61,200	57,404	9,000	?	-	75,000	66,590	-	?	-
	SUDAN	298,850	48,887	54,000	-	410,737	717,970	36,000	37,668	-	791,638

TABLE VI

NATIONAL PERSONNEL OF ANTI-MALARIA SERVICES
EASTERN MEDITERRANEAN REGION COUNTRIES - 1959

Country or Territory	Prof.	Tech. Auxiliaries			Adminstr.	Personal	Drivers & Mechanics	Others	TOTAL
		Surv. Agents	Mal. Tech.	Field Superv.					
CYPRUS	9	45			1	200	-	200	454
ETHIOPIA	1	2	6	4	2	75	7	12	109
FR.SOMAL.	1	6			1	11	2	10	41
IRAN	57	818	112	285	239	5000	565	290	7366
IRAQ	4	118	127	34	54	2733	238	176	3484
ISRAEL	1	27			2	-	15	190	235
JORDAN	3	13	15	15	16	262	22	24	370
LEBANON	2	4	14	2	5	100	12	31	170
LIBYA	1	-	3	4	-	15	2	-	25
PAKISTAN	23	116			15	580	16	31	781
S.ARABIA	6	-	14	13	20	82	18	289	444
SOMALIA	2	13	5	17	2	136	17	71	263
SUDAN	2	24	4	-	3	241	12	5	291
TUNISIA	1	44			-	360	10	30	445
UAR (EGYPT)	50	-	50	519	52	1065	56	199	1991
UAR (SYRIA)	7	26	34	118	18	854	46	159	1262

ANNEX II

EXCERPT FROM REPORT ON THE SECOND REGIONAL CONFERENCE ON MALARIA ERADICATION*

Addis Ababa 16 - 21 November 1959

3. RECOMMENDATIONS

3.1 The Magnitude and Features of the Malaria Problem in EMR

The Second Regional Conference on Malaria Eradication, after consideration of the magnitude of the malaria problem in the countries of the Eastern Mediterranean Region, particularly that of Pakistan, the status of the malaria programme in the African Region, the features of the malaria epidemic that ravaged Ethiopia in late 1958, and the special characteristics of Oasis Malaria,

RECOMMENDS that:

3.1.1 The Regional Office take active steps to stimulate the authorities in the countries and territories that have not yet started active antimalaria measures to undertake such measures as early as possible.

3.1.2 Attention be drawn to the difficulties involved in implementing a malaria eradication programme in Ethiopia; that appreciation be expressed of the steps taken by the Government in establishing a Malaria Eradication Service and the measures contemplated to prevent the recurrence of malaria epidemics, and that the Government be urged to intensify its training programme in view of the expansion of antimalaria activities.

3.1.3 Pakistan be congratulated for its decision to adopt the policy of malaria eradication and the steps taken in developing a plan of operation for malaria eradication by steps, and that the international bodies be urged to extend their full support to Pakistan inasmuch as it represents the biggest malaria problem in the Region.

3.1.4 Appreciation be expressed of the work so far done in connexion with the malaria in the oases which has brought to light the inherent difficulties and diversity of problems connected with it as well as the feasibility of malaria eradication in them.

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*Document WHO/Mal/265- EMRO/Mal/43., p.41/49

3.1.5 Attention be drawn to the status of the malaria programme in the African Region, and the peculiar circumstances that led to the delay in the achievement of interruption of transmission there, and to the expectation that with the expansion of the pilot project areas and the execution of geographical reconnaissance, the desired results may be achieved.

3.2 Planning of Malaria Eradication Programmes

The Second Regional Conference on Malaria Eradication,

Recognizing the importance of the activities preparatory to the establishment of a malaria eradication programme, such as pilot projects, pre-eradication surveys, training of personnel, legislation, the development of good public relations and health education,

Noting the progress made and difficulties encountered in the conduct of these activities in some countries of the Region,

RECOMMENDS that:

3.2.1 In pilot projects:

i. the selection of the project area should be considered as of main importance.

It should be large enough and its malaria endemicity should be representative of the prevalent conditions of the disease in the whole country.

ii. there should be a thorough geographical reconnaissance, detailed mapping and investigations to establish an epidemiological and entomological base line.

iii. spraying should be carried out to ensure total coverage.

iv. the assessment of the results of the project should include a study of the infant parasite rate, frequent active malaria case finding, at least once every month and more often during the period or periods of transmission, and all relevant entomological investigations.

3.2.2 A pre-eradication survey should be deemed to be an integral part of a malaria eradication programme and should have as its objective the preparation of a comprehensive plan of operation based on a critical review of previous data and the investigation of the problems peculiar to the area, including the social and economic pattern of the country.

The Conference stresses the fact that the pre-eradication survey is not a research activity but shall confine itself in its epidemiological surveys to a study of the general contour of malaria in the country.

The survey should define the plan of action for the eradication programme and should describe the means by which continuity in the execution of the eradication programme is ensured.

3.2.3 National Training Centres should be established as early as possible and should be capable of training personnel in numbers sufficient for the staffing of the National Malaria Eradication Service. The courses should be related to the educational background of each category of trainees - who should be drawn from all parts of the national territory.

The curriculum should be oriented to the latest philosophy and techniques of malaria eradication. The standard of training should be raised by the co-opting of international teaching staff. The duration of the course should be adequate, extending over a period of not less than three months.

In-service training is essential and may be undertaken both within the country of the trainee or in other countries.

3.2.4 International training centres should be reserved for higher categories of malaria eradication workers and the teaching staff of the national training institutes.

Governments should ensure that trainees, upon satisfactory completion of their programme of studies, are employed in the National Malaria Eradication Service.

3.2.5 Legislation should be enacted before the plan of operation comes into being. The legislation should provide, inter alia, for the creation of the Service, for the vesting of adequate administrative and financial autonomy in the Malaria Eradication Service, appropriate remuneration for malaria workers, the co-operation of other departments of government, the compulsory notification of cases, and such other enforcement powers as are necessary for the conduct of the campaign.

3.2.6 The objective in establishing good public relations being to ensure the favourable attitude of the public, attention should be given to the three segments of the public, namely the staff of malaria workers, other governmental and semi-governmental organizations, and the general public.

The most effective media appropriate to the national customs, and socio-economic and educational level of the country, should be employed.

3.2.7 Health education should be commenced at an early stage in an eradication campaign. Special attention should be paid to the training of the regular staff of malaria workers in the basic principles of health education. The help of volunteer community leaders should be secured.

3.3 Administrative and Financial Aspects

The Second Regional Conference on Malaria Eradication,

Recognizing the importance of proper organizational pattern of the Malaria Eradication Service,

Noting the benefits derived from decentralization of operations and the application of sound administrative procedures,

Recognizing the policies of the international bodies assisting malaria eradication programmes and the impact of these on the economic development of the countries, and

Considering the difficulties resulting from lack of financial autonomy in Malaria Eradication Services,

RECOMMENDS that:

3.3.1 The organization be designed to provide for the proper execution and evaluation of malaria eradication measures through an extensive supervisory system;

3.3.2 the scope of eradication measures be not extended until trained staff in sufficient numbers has become available,

3.3.3 with the expansion of the programme necessary steps be taken to provide for the decentralization of operation at the appropriate time.

3.3.4 provision be made in advance to ensure that the personnel of Malaria Eradication Service receive the necessary training at the appropriate time to enable them to be absorbed into, or integrated with the Public Health Service on the completion of the malaria eradication campaigns;

3.3.5 the administrative procedures be such as would secure the smooth working of the eradication measures speedily and efficiently;

3.3.6 budgetary and administrative autonomy of the Malaria Eradication Service be secured as without it the success of the campaign would be jeopardized. The powers granted for this purpose should be vested in the Director of the Malaria Eradication Service but may be delegated to a corporate body composed of a majority of technically qualified persons;

3.3.7 attention of the governments be drawn to the modification of the policies of the international aid agencies for providing support to malaria eradication programmes;

3.3.8 the governments should view the eradication of malaria as an integral part of their economic development projects and malaria eradication programmes especially in economically promising areas should be closely coordinated with all other measures to improve the economic and social well-being of the population;

3.3.9 the various items of expenditures be kept under constant review to determine ways and means of effecting possible economies, which should however, not be done at the cost of operational efficiency;

3.3.10 the scales of remuneration and the terms of service of the personnel of the Malaria Eradication Service be such as will ensure the availability of adequate numbers of suitable applicants for posts at all levels.

3.4 Technical Aspects

The Second Regional Conference on Malaria Eradication;

Having noted the reports on the techniques of spraying, on total coverage, and surveillance as practised in some of the Eastern Mediterranean countries, and discussed the use of antimalarial drugs and the different aspects of national co-ordination,

RECOMMENDS that:

3.4.1 the total coverage should be the aim of all residual spraying operations;

3.4.2 in order to perfect the quality of spraying, special attention be given to the training of spraymen, to the proper use and maintenance of the sprayers and nozzles and the importance of close and constant supervision;

3.4.3 entomological assessment of the effectiveness of the residual deposit on sprayed surfaces by means of suitable tests such as anopheline densities, determination of night biting and survival rates, be regularly carried out;

3.4.4 the surveillance activities be begun as early as possible in the attack phase and be developed to reach the highest point of efficiency in the year immediately preceding the discontinuation of residual spraying, in order to provide the criteria of total interruption of transmission for the termination of spraying activity. This same level of efficiency should be maintained throughout the consolidation phase in order to discover and eliminate any residual foci of malaria transmission;

3.4.5 in order to ensure the effective execution of surveillance, surveillance agents be:

a) subjected to a thorough course of training prior to employment;

b) assigned an area for house-to-house visits which, taking into account the population densities, the means of communication and distances, can be efficiently dealt with by one person in one month;

c) provided with detailed maps of the area and a roster of households;

d) given facilities for the quick dispatch of blood slides to laboratories and for the prompt receipt of the results of examination;

3.4.6 in view of the high cost of surveillance programmes, economy consistent with efficiency be practised by such measures as reduction in the frequency of visits, the use of least expensive means of transport, and utilization of facilities for passive

surveillance afforded by existing institutions, laboratories, the medical profession, community leaders and voluntary collaborators;

3.4.7 in the course of the surveillance programme, apart from efficient supervision and epidemiological investigations on every malaria positive case, provision be made for periodic mass blood surveys to verify the efficiency of the case-finding activity;

3.4.8 the administration of antimalarial drugs be regarded as a very important tool in the malaria eradication programmes when given in accordance with the WHO recommended standards for the use of these drugs, and with a clear understanding of their rôle in each stage of the malaria eradication programme and in each circumstance that may necessitate their use exclusively or as a supplement to residual spraying programmes. Special stress be laid on the radical cure of vivax infections;

3.4.9 co-ordination between international bodies at headquarters, regional and country level be fostered in such a manner as would ensure the maximum benefit to the countries undertaking malaria eradication programmes in line with sound technical planning and execution;

3.4.10 the Regional Office of WHO seek the active co-operation of the governments to supply regular and comprehensive information on the progress of malaria eradication programmes in their respective territories; to provide facilities for the in-service training of professional personnel from other countries, and to secure the co-ordination of their activities in the frontier areas through inter-country agreements; and to participate in the Regional Malaria Eradication Conference;

3.4.11 the Regional Office take steps to establish a malaria co-ordination board which will serve neighbouring countries of this and the adjoining regions to ensure effective co-ordination of malaria eradication activities along the frontiers as well as rapid exchange of information between these countries on the progress of their programmes.

3.5 Technical Problems

The Second Regional Conference on Malaria Eradication,

Recognizing the existence of technical problems related to the execution

of malaria eradication programmes, including vector resistance to insecticides, elusive habits of certain vectors as well as the problem of nomadism, and the need of further research to solve these problems,

RECOMMENDS that:

3.5.1 In entomological studies

a) entomological investigations should be intensified to support epidemiological evaluation of the malaria eradication measures aiming at total interruption of malaria transmission;
b) the entomolgical techniques and methods should be given a thorough trial under various field conditions before standardizing them for field practices;
c) the entomologists assigned to malaria eradication services should be given a comprehensive training course on their rôle and their field of activities vis-à-vis the objectives of the malaria eradication measures;
d) they should be provided with a guiding manual relating to their duties;
e) entomological investigations should be started before the implementation of the malaria eradication programme to establish the base line of vector susceptibility to insecticides and should be carried out regularly throughout its various phases;
f) the Malaria Eradication Service should be consulted for the choice and use of agricultural pesticides so that their application will not hasten vector resistance.

3.5.2 In connexion with nomadism:

the governments should be stimulated to promote ecological studies among nomads within their territories as well as to define their rôles in the epidemiology of malaria. In addition, the governments should strive to interrupt malaria transmission among nomadic populations through settlement, health education, use of antimalaria drugs, spraying of their tents, larviciding, and the training of malaria workers from among them. These trained personnel can be charged advantageously to carry out eradication measures among the nomads.

3.5.3 WHO should stimulate and coordinate basic and operational research on the various epidemiological, entomological and ecological problems as well as on laboratory field techniques and the development of antimalarial drugs of increased efficacy and longer residual effect, as well as the development of new suitable and safe insecticides, to continue to investigate new approaches to malaria eradication.

ANNEX III

I R A N

TYPE OF PROGRAMME

Eradication by stages - involving 13 million population out of a total of 20.5 million (Annex I - Table I).

PRESENT AGREEMENT (Plan of Operation)

A five-year Plan of Operation for malaria eradication assisted by WHO and UNICEF came into effect on 9 December 1957. This was followed by two Exchanges of Letter for the provision of a WHO Administrative Officer in 1959 and a Sanitary Engineer in 1960, together with fellowships, partial payment of salaries for 1959 to 1961 inclusive and some supplies.

SPRAYING OPERATIONS

Number protected by spraying during 1959 5,621,500

Insecticide used: Out of the above population 1,434,000 persons were protected twice by dieldrin at a dosage of 500 mg. per sq.m., and the rest by one round of DDT 75% w.p. at a dosage of 2 grs. DDT Technical grade per sq.m.

Labour force and transport: An average of 2,400 spraymen were engaged in teams of 10 spraymen, headed by a team-leader having two foremen for supervisory purposes and assisted according to size of community by 1 or 2 mixers and 1 marker.

4-wheel-drive pick-ups were used for transport - each pick-up for one complete spraying team.

A total of 385 motor vehicles are used in spraying operations.

Spraying teams and their transport are decentralized, directed and supervised from provincial centres.

Evaluation:

1. Total coverage is lacking in certain areas due to incomplete geographical reconnaissance and also due to lack of good roads and communications. No assurance can be given to the total coverage of nomadic huts.
2. Technique of spraying is not up to the standard in certain areas, due to the seasonal nature of the programme requiring annual training of large numbers of new spraymen.

EPIDEMIOLOGICAL SURVEILLANCE ACTIVITIES

Total population under surveillance 6,567,000

Out of this there is a population of 4,170,000 under the consolidation phase.

Organization of work: There are 818 surveillance agents. Each team consists of three agents with one supervisor and is provided with a Jeep. Each surveillance agent covers a population of approximately 9,000 persons. House to house visits are made and blood samples taken from suspected cases and provided with a single dose treatment - 600 mg. Chloroquine and 50 mg. Pyrimethamine.

Laboratory Activities: During 1959 there existed 10 laboratories in the ostans and 31 in the districts. The total number of microscopists employed was 96. The Institute of Malariology checks all positive slides and 10% of the negative slides.

During 1959, 200,520 blood slides were examined of which 1,961 were found positive for malaria.

Difficulties encountered:

1. Lack of supervision due to decentralization only at shahrestan level and not at baksh level.
2. Lack of epidemiologists at ostan level to carry out epidemiological investigations on every positive case. This duty is now given to the supervisor of surveillance agents.
3. Lack of facilities for radical treatment of positive cases by Primaquine, due to above-mention shortage of epidemiologists, and the fear to administer this toxic drug on a domiciliary basis.
4. Delays in blood examination caused by long distanc lack of communications between the field and the laboratories.
5. A great shift-over of microscopists due to unattractive service conditions.

The Plan of Action for 1960 has taken consideration of the above difficulties and progressive improvement is expected.

ENTOMOLOGICAL ACTIVITIES (Annex I, Table IV)

A. stephensi was reported to be dieldrin-resistant in the south-eastern part of Iran (37% mortality to 1.6% dieldrin for 24-hour exposure). High tolerance to DDT was also noted in the same population of A.stephensi (LC_{50} higher than 2% and only about 80% mortality to 4% for 1-hour exposure). Fortunately this cross-resistance to dieldrin and DDT is reported in very limited areas and DDT is now being applied as it is presumed to be still effective.

Other proved vector species - A.maculipennis, A.culicifacies, A.sacharovi, and A.superpictus are still susceptible to DDT. Bio-assay tests carried out at regular intervals on the dieldrin-sprayed mud-walls show that dieldrin residual effect was for about four months and mortality of less than 50% was invariably observed after four and half months.

ADMINISTRATION AND FINANCE (Annex I, Table V)

Autonomy: The Director of Malaria Eradication Organization has ministerial administrative power but no financial power especially as the Plan Organization insists on pre-auditing and post-auditing of all accounts by their special accountants.

National Budget during 1960: $ 3,129,330

UNICEF Assistance during 1959 for 1960 programme: $ 968,000

WHO Assistance during 1960:

This involves an expenditure on: a malariologist, sanitary engineer, and administrator; as well as partial payment of salaries.....$ 124,802

1960 Plan of Action

The 1960 Plan of Action is based on the consolidation of the gains achieved in the northern responsive two-thirds of the country and to maintain the 1959 activities in the refractory zone south of the Zagros range of mountains. In the latter area some research pilot projects to study technical problems connected with nomadism and vector resistance are under way.

Future Prospects

The financial problem is being gradually solved. Technical problems are under study. Supervision and evaluation are improving following the gradual decentralization to baksh level.

I R A Q

TYPE OF PROGRAMME

Eradication on total coverage basis involving 4.5 million population out of a total of 6.5 million. (Annex I, Table I).

PRESENT AGREEMENT (Plan of Operation)

The new comprehensive Plan of Operation developed early in 1960 supersedes the old Plan of Operation, Addendum, and Exchanges of Letter which started off the programme early in 1957.

SPRAYING OPERATIONS

Number protected by spraying during 1959 2,750,

Insecticide used: Out of the above population 1,406,000 were protected twice by DDT 75% w.p. at a dosage of 2 grs. DDT Technic grade per sq.m. in the highly infested A.sacharovi area in the north and central regions. Also 488,000 population were protected by two rounds of dieldrin 50% w.p. (600 mg. per sq.m.) where A.stephensi is the vecto and where transmission is known to extend for about eight months.

Out of the same figure also 382,700 persons were protec with more than two rounds due to summer-hut spraying in the northern region and re-spraying due to white-washin remodelling and construction of new houses.

Labour force and transport: Each spraying squad is headed by a squad leader and consists of 2 to 4 spraymen assisted by 1 mixer. An average of 4 squads are supervised by 1 team leader, eve of whom are supervised in turn by 1 inspector.

Total force during 1959 ..... 1,767 spraymen
483 mixers
483 squad leaders
120 team leaders
31 inspectors
12 assistant-sanitarians

Each spraying team is provided with a 4-wheel-drive pick-up. A total of 147 motor-vehicles are used in spraying operations. Motor boats as well as animal tra port are also utilized.

Evaluation: Total coverage is fairly good due to availability of good maps and good network of roads. Prolongation of the spraying programme in certain areas after the start of the transmission season was mainly due to difficulties of administrative nature.

The technique of spraying is fairly good but again due to the seasonal nature of the programme and recruitment of new spraymen, certain shortcomings are apparent.

EPIDEMIOLOGICAL SURVEILLANCE ACTIVITIES

Total population under surveillance in 1959..... 1,616,774

Out of this there is a population of 538,748 under the consolidation phase.

Organization of work: (Annex I, Table VI) During 1959, there were 118 surveillance agents. This figure has been raised during 1960 to 500 surveillance agents. Each surveillance team working in rural areas consists of three surveillance agents headed by a team leader and provided with one Dodge Power-Wagon. One inspector supervises three such teams. Each surveillance agent is responsible to cover an average population of 11,500 inhabitants in rural areas. House to house visits are made, blood samples taken from suspected cases and drugs are administered according to WHO recommendations including Primaquine for radical cure.

Laboratory Activities: During 1959, there existed apart from the Central Laboratory (18 microscopists), two regional laboratories (47 microscopists) and 14 liwa or provincial laboratories (14 microscopists) - one laboratory per liwa or province.

An increase of almost 100 microscopists is envisaged in the 1960 programme.

180,594 blood slides were examined in 1959 and 551 were found positive for malaria.

Difficulties encountered:

1. Lack of funds necessitated restriction of the surveillance programme in 1959 to 1,616,774 instead of the originally planned 3.8 million population.
2. Epidemiological investigation on every positive case is lacking due to non-availability of epidemiologists at liwa level to supervise this work.

3. Radical treatment although administered on domiciliar basis with no apparent toxic complications so far, is yet restricted to adults and children above six years of age.
4. The reliability of microscopists in examining blood slides is questioned due to short training period and lack of supervision

The Plan of Action for 1960 has taken consideration of the above difficulties and with adequate budget and intensive training the situation is expected to improve.

ENTOMOLOGICAL ACTIVITIES

The vector species - A.sacharovi, A.stephensi, A.superpictus and A.maculipenn: are still susceptible to the insecticides used as evidenced by the disappearan of these vector species in sprayed premises. In fact, the WHO entomologist could not carry out, during 1959, any susceptibility tests due to the scarcity of the vector species - both adult and larvae.

The disappearance of the DDT-resistant A.stephensi in the south after shifting to dieldrin is quite impressive.

ADMINISTRATION AND FINANCE (Annex I, table V).

Autonomy: The recent development of the Malaria Eradication Board and the powers invested in it by the Minister of Health has contributed to the straightening up of most of the financial and administrative difficulties.

National Budget during 1960: $2.34 million.

UNICEF assistance during 1960: $228,000 to provide DDT and some other supplies

WHO assistance during 1960: Under MESA $43,465 and under Regular $37,700. This is to cover expenditures on WHO personnel including 3 malariologists, 1 entomologist, 1 sanitarian and 1 administrative officer, as well as some fellowships and supplies.

1960 Plan of Action

The 1960 Plan of Action will involve spraying operations for 2,864,000 population out of which 1.4 million will receive two rounds of spraying. 4.4 million population will be put under 100% surveillance coverage out of which 1,636,000 under consolidation phase.

Future Prospects:

The development of the new comprehensive Plan of Operation and the Government's keen interest to finance this programme adequately until its termination are favourable signs. No serious technical problems are encountered and the successful issue of this programme is based on the strengthening of the surveillance and epidemiological investigation activities as well as the development of effective supervision of the various activities at liwa level.

PROVINCE OF SYRIA - UAR

TYPE OF PROGRAMME

Eradication on total coverage basis involving 1.5 million population out of a total of 4,450,000.

PRESENT AGREEMENT

A new comprehensive Plan of Operation is being finalized for an extension of the programme for a further four years from 1961 to 1964 inclusive. This will supersede the 1956 Plan of Operation which lasted for five years and will terminate by the end of 1960. The extension of the programme for four more years has been necessitated by the incomplete coverage of the country due to financial and administrative difficulties.

SPRAYING OPERATIONS : (Annex I, Table III)

Number protected by spraying during 1959 1,048,600

Insecticide used: DDT 75% w.p. at the dosage of 2 grs. Technical grade per sq.m. in one round. In certain urban areas DDT emulsion 25% was used.

Labour force and transport: Each spraying team consists of 5 spraymen, 1 mixer and 1 squad leader. An assistant mechanic is attached to each 2 or 3 squads. Each 2 or 3 squads are supervised by 1 assistant sanitarian.

Spraying operations are decentralized in Damascus and six other provincial offices. Each province has a supervisor for spraying operations. Damascus and the two southern provinces have only one.

Total number of provincial supervisors 5

Total labour force.....450 spraymen
91 mixers
91 squad leaders
30 assistant sanitarians
40 assistant mechanics

Spraying teams are transported by pick-ups to small communities and by large trucks to larger ones. A total of 55 vehicles are available.

Evaluation: Total coverage has been achieved during 1959 in areas where operations were carried out. However, these could not be completed in certain instances before the malaria transmission season started due to administrative and financial difficulties. The technique of spraying is fairly good and the good network of roads and available maps of every area, and the adequate transport contribute to an effective supervision.

EPIDEMIOLOGICAL SURVEILLANCE ACTIVITIES

Total population under surveillance in 1959 ..... 340,000.

Out of this there is a population of 302,000 under the consolidation phase in Damascus Province.

Organization of work: During 1959, there were 26 surveillance agents and 4 supervisors. The number of surveillance agents will be raised during 1960 to 36 when Homs Province comes under the consolidation phase. Each surveillance agent is responsible to cover an average population of 12,000. In two of the zones of Damascus Province which have always been practically free from malaria, each surveillance agent covers up to 30,000 population per month. House to house visits are made, blood samples taken from suspected cases and antimalaria drugs are administered according to WHO recommendations including Primaquine for radical cure of P.vivax and P.malariae.

Passive surveillance was established in October 1959 in Aleppo Province which is still in the attack phase. Already there are 137 voluntary collaborators covering a population of 303,000. During the six months' period, October 1959 to March 1960 inclusive, 4113 slides were collected from fever cases.

Laboratory Activities:

One laboratory exists in each of the three Provinces where surveillance operations are carried out, namely Damascus, Homs and Aleppo.

A total of 22 microscopists are available.

Difficulties encountered:

1. Delays encountered in recruitment and training of surveillance agents due to administrative difficulties.
2. Transportation of groups of surveillance agents by vehicles and distribution in villages was not inducive to good supervision. The use of mobilets, however, distributed to each surveillance agent, ensured a good coverage of the area allotted to each of these agents. However, these mobilets needed continuous repair and necessitated the appointment of extra mechanics.
3. Epidemiological investigations and radical treatment of positive cases in areas under the consolidation phase are so far effectively carried out. However, when more areas come under consolidation phase, more trained personnel will be needed.

The cooperation of the people has lately been increasing due to introduction of health education approaches and methods. These, however, should have started earlier and maintained all through.

ENTOMOLOGICAL ACTIVITIES

Both A. sacharovi and A. superpictus are still responding to DDT residual spraying as evidenced by the disappearance of adult mosquitoes in sprayed premises and larvae in breeding places. No susceptibility tests were carried out in sprayed areas on account of the scarcity of vector species.

A. sergenti exists in some tributaries of the Yarmuk River in the south. This is controlled through larviciding operations.

ADMINISTRATION AND FINANCE : (Annex I, Table V)

Autonomy: As mentioned before, an extension of this eradication programme by four years was necessitated by the ever-recurring administrative and financial difficulties. The new Plan of Operation which will be effective in 1961, guarantees full administrative and financial powers to the Ministry of Health who will delegate them to a Malaria Eradication Committee. This will ensure a smooth-running operation.

National Budget during 1960: $198,918.

UNICEF Assistance during 1959 for 1960 Programme: $227,000.

WHO Assistance during 1960: Under MESA $25,705 and under TA $24,825. The above are to cover expenditures on WHO personnel including a malariologist, 2 sanitarians and 1 Administrative Officer; as well as fellowships and supplies.

1960 Plan of Action

The 1960 Plan of Action will involve spraying operations for 1,167,000 population. 390,000 population will be put under 100% surveillance cover out of which 340,000 will be under the consolidation phase.

Future Prospects

The experience gained during the last five years has contributed to the development of a comprehensive Plan of Operation covering the extension period 1961 to 1964 inclusive. No technical problems are encountered and a successful issue of this programme is assured if both Government and international agencies fulfill their commitments which are detailed year by year in the Plan of Action.

L E B A N O N

TYPE OF PROGRAMME

Eradication on total coverage basis involving 683,000 population out of a total of 1,600,000 (Annex I, Table I).

PRESENT AGREEMENT

The original Plan of Operation that started the programme in 1956 is coming to an end by 1960. An addendum to the original Plan was signed mid-1959, offering the services of a short-term consultant to help in the development of a comprehensive Plan of Operation for extending this programme until completion. The new plan, scheduled to start in 1961, is now being finalized.

SPRAYING OPERATIONS (Annex I, Table III)

Number protected by spraying during 1959 295,000

Insecticide used: Mainly DDT 75% w.w. and DDT 25% emulsion at a dosage of 2 grs. Technical grade per sq.m. in one round. Dieldrin 50% w.w., as well as Diazinon 40% w.p. were used in small quantitites at a dosage of 0.4 gr.per sq.m.

Labour force and transport: Each spraying team consists of 3 spraymen, a mixer and a squad leader.

Total labour force ..... 60 spraymen
20 mixers
20 squad leaders
2 field supervisors

The spraying operation in Lebanon is centralized and directed from the Headquarters of the Malaria Eradication Services.

Eleven vehicles were available for the spraying programme. 2 Pick-ups and 3 Trucks were used for movements of the squads while 4 light vehicles and 2 station wagons were used for supervisory purposes.

Evaluation:

1. Total coverage of the 522 villages where spraying operations were carried out was not maintained and in some villages only an average of 50% of the houses was sprayed.

2. The centralization of the spraying programme caused loss of time, travelling and more wear and tear in the transport which was already over-run.
3. The spraying technique is not up to the standard due to temporary nature of the spraying squads and their rapid training.

EPIDEMIOLOGICAL SURVEILLANCE ACTIVITIES

Total population under surveillance in 1959 683,000

Out of this there is a population of 388,000 under the consolidation phase.

Organization of work: Both active and passive surveillance are carried out. There are 24 malaria detection posts, one in each caza (district) where the caza doctor is responsible for passive detection in areas once known to be malarious.

There are 4 active surveillance teams each in charge of a district and is responsible to visit the villages in his district monthly. 300 villages where malaria occurred in recent years were thus visited by these agents. 400 other villages are visited every three months and 300 more visited once a year by the same teams - these 700 villages had no malaria in recent years.

The small number of active surveillance agents, especial in regard to the number of villages they have to visit, leads to the inference that no house to house visits are followed, although there is a good response of the people, especially as surveillance agents distribute also other curative drugs for minor ailments apart from the antimalaria drugs.

Laboratory Activities: There is a central laboratory in Beirut attached to the Malaria Eradication Service where 4 microscopists are employed.

Total number of slides examined during 1959.....25,955
Number collected by active case detection.....23,225 (no positives)
Number collected by passive case detection..... 800 and one positive (P.vivax)
Infant surveys..... 1,930 (negative)

No detailed epidemiological investigation was carried it. Fortunately there was only one positive case. The treatment does not follow WHO recommendations and no radical cure is given.

ENTOMOLOGICAL ACTIVITIES

A. sacharovi and A. superpictus are the important malaria vectors in Lebanon. Both seem to be quite susceptible to DDT and dieldrin, evidenced by the absence of mosquitoesin sprayed houses. No susceptibility tests were carried out during 1959 due to scarcity of the vector species. Four entomology technicians carried out density observations by hand collection technique in the houses.

ADMINISTRATION AND FINANCE : (Annex I, Table V)

Autonomy: The Director of the Malaria Eradication Service, falling directly under the Director-General of Health, enjoys administrative and financial power delegated to him.

National Budget during 1960: $58,380

UNICEF Assistance during 1959 For 1960 Programme: $5,000 (during 1961 this is expected to be $10,000).

WHO Assistance during 1960: Under MESA $14,040 are earmarked to fulfill commitments in the new Plan of Operation including services of a Malariologist and a Technician, and some fellowships.

FUTURE PROSPECTS

The 1960 Plan of Action will follow that of 1959 as the new Plan of Operation will come into effect early in 1961. The stress in the new Plan of Operation is towards the strengthening of the surveillance activities and decentralization of operations.

The limited problem of malaria in this small country and the apparent disappearance of malaria, show that if the Government maintains its interest in eliminating any residual foci and developing passive surveillance effectively, the country will, in future years, be ready to declare its freedom from this disease.

I S R A E L

TYPE OF PROGRAMME

Eradication - total coverage basis involving the whole population of 2,071,179.

PRESENT PROGRAMME

The implementation of the Plan of Operation signed by WHO and the Government in August 1959 and which would have come into effect April 1960, is being delayed until 1961 pending the visit of the short-term consultant late in 1960 to help in the development of a comprehensive Plan of Operation that will strengthen field operations until the successful completion of eradication.

SPRAYING OPERATIONS (Annex I, Table III)

Number protected by antimalaria measures,
mainly larviciding campaign, during 1959 1,285,320

out of this number 79,859 persons were protected by residual spraying.

Insecticide used: Residual insecticide used is DDT Technical 5% solution in Kerosene at a dosage of 2 grs. Technical grade per sq.m. This is done in one or more rounds. The larvicide used is mainly malariol and solar oil.

Labour force and transport: As the spraying is done rather on a focal basis, there are only three spraying squads each having 5 spraymen and 1 foreman who is also in charge of mixing. 17 pick-up trucks are available for transportation of the spraying personnel and supervisory staff.

EPIDEMIOLOGICAL SURVEILLANCE ACTIVITIES

Total population under surveillance (Passive) in 1959 2,071,179
Population under consolidation phase 706,000

Organization of work: Surveillance activities are based mainly on passive detection of cases due to the availability and cooperation of all clinics and hospitals dispersed all over the country.

Active surveillance is being developed and a pilot project is under way in the parts of the Lower Galilee and Beith Shean Valley on the Israeli side of the Jordan Valley where 50 settlements involving 50,000 inhabitants exist.

Most of the autochthonous cases were reported here. Special surveillance is established to new immigrants who are being examined once every year. Epidemiological investigations are carried out on every positive malaria case; apart from the pilot study area where anti-malaria drugs are administered according to WHO recommendation, different treatment schedules exist in other parts of the country.

Laboratory Activities:

No special malaria laboratories exist in the periphery of the country apart from a central laboratory in Jerusalem where all positive slides collected by hospitals and clinics are re-examined for checking.

Total number of slides examined during 1959.....9,649
58 cases were found positive:

51 in areas under attack phase, and
7 in areas under consolidation phase.

Epidemiological investigations carried out on the 7 cases (4 P.vivax, 1 P.falciparum, and 2 P.malariae) detected in the consolidation phase area showed two to be sporadic, three to be imported, and two to be induced.

ENTOMOLOGICAL ACTIVITIES

A.sacharovi, A.superpictus, A.sergenti constitute the main malaria vectors in Israel. Secondary vectors - A.claviger, A.pharoensis, and A.multicolor may play a minor rôle in malaria transmission. Both A.sacharovi and A.superpictus are still susceptible to DDT in both larvae and adults and have been almost eliminated. A.sergenti, on the other hand, with its maximum peak in September/October, constitutes a problem due to the fact that certain populations show exophilic and exophagic tendencies, thus evading the effect of residual spraying and have to be controlled by larviciding operations.

Studies on the bionomics of A.sergenti in Israel helped by a WHO research grant are under way.

ADMINISTRATION AND FINANCE (Annex I, Table V)

The Malaria Eradication Service deals also with other activities including mosquito control and bilharzia control. Some of the malaria workers have polyvalent activities.

National Budget during 1960: $241,660 (expenditures on malaria alone unavailable).

WHO Assistance during 1960: Under MESA $6,000 to cover the services of a short-term consultant.

$3000 for research grant on A. sergenti, and some supplies.

(18,100 worth of vehicles, drugs and other laboratory supplies were made available to the country in 1959 for the eradication programme).

Future Prospects:

The limited malaria problem existing in the country and the excellent network of medical services will contribute to effective passive detection of malaria cases. However, the strengthening of the Malaria Eradication Service and the orientation of its activities towards the development of an efficient active surveillance system will help in the elimination of the few residual foci of malaria transmission still existing in the country.

J O R D A N

TYPE OF PROGRAMME

Eradication - total coverage basis involving 760,500 population out of a total of 1,489,000.

PRESENT AGREEMENT

The new comprehensive Plan of Operation was signed early in 1960. This supersedes the previous Plan of Operation which came into effect early in 1958. This new plan, starting in 1960 will continue through 1964 after which all the country will be in the maintenance phase.

SPRAYING OPERATIONS : (Annex I, Table III)

Number protected by spraying during 1959..... 149,000
Number protected by larviciding operation
(mostly in the Jordan Valley)..... 153,000

Insecticide used: Mainly DDT 75% w.p. in one round of spraying at a dosage of 2 grs. Technical grade per sq.m.

Larviciding was done by solar oil with 2.5% pine resin.

Other anti-larval measures such as drainage were also extensively carried out.

Labour force and transport: Each spraying team consisted of 5 spraymen, 1 mixer, 1 helper and 1 squad leader.

Total labour force :
50 spraymen
10 mixers
10 helpers
10 squad leaders

Larviciding Operations:

There were 183 larviciders and 11 supervisors - (also for larviciding).

A total of 23 vehicles were made available (ten for spraying operations), including pick-up trucks for transportation of squads and light Jeeps for supervisory staff.

Evaluation: 1. Total coverage was not achieved in 1959 due to lack of geographical reconnaissance and budgetary limitations.

2. The technique of spraying was below standard due to short-comings in the training and supervision of spraymen.
3. Apart from the Jordan Valley, the larviciding operations in other parts of the country lacked supervision.

EPIDEMIOLOGICAL SURVEILLANCE ACTIVITIES

Total population under surveillance in 1959..... 470,000

Organization of work:

Active surveillance was mainly carried out by 13 surveillance agents mostly in West Jordan and Jordan Valley. There is one supervisor for every three surveillance agents. (Total 4). Each surveillance agent is in charge of effecting house to house visits for an average completion of 17,000.

5 Chevrolet pick- ups are available for transportation of surveillance agents and supervisory staff.

Blood specimens are taken from all suspected cases who are given a dose of Chloroquine 600 mg. plus 50 mg. Pyrimethamine.

Positive cases are given standard therapeutic drugs according to WHO recommendations, but no radical cure so far has been practised.

Laboratory Activities:

There is a central laboratory in Amman, and two district laboratories - one in Amman and one in Jerusalem. 11, microscopists are available and these are supervised by a parasitologist.

Laboratory activities during 1959 can be summarized in the following:

	No. slides examined	No. Positive		
		F	V	M
Areas under active surveillance.....	8,081	10	48	3
Areas under passive surveillance.....	-	15	72	
From other areas by malariometric surveys	39,229	263	274	34
TOTAL...	47,310	288	394	37

No detailed epidemiological investigation was carried out in areas considered to be under consolidation phase.

Difficulties encountered: Surveillance operations in the consolidation area did not start until the latter half of the year due to shortage of technical staff as well as budgetary limitations.

No epidemiological investigations were carried out for the positive cases and radical treatment was not given due to above shortages.

ENTOMOLOGICAL ACTIVITIES : (Annex I, Table IV)

A.sacharovi, A.superpictus, and A.sergenti are the main malaria vectors. The former two have almost disappeared following residual spraying programmes carried out during the past years. A.sergenti, however, with its exophilic and exophagic tendencies has to be controlled by extensive larviciding operations. It showed resistance to dieldrin in a limited area of Jordan Valley during 1958, following the application of dieldrin residual larvicide on one or two occasions previously. Recent investigations showed that it is still susceptible to DDT. (LC_{50} = 0.52).

ADMINISTRATION AND FINANCE : (Annex I, Table V)

Autonomy: The Malaria Eradication Service enjoys powers delegated to it by the Minister of Health.

National Budget during 1960: $140,000 - ICA is financially supporting this project through the Development Board and is providing a Malaria Eradication Officer.

UNICEF Assistance for 1960 Programme: $19,000

WHO Assistance during 1960: Under MESA 31,575 and
under TA 11,600
to cover expenditures on personnel, including a malariologist, an entomologist, a sanitary engineer and a sanitarian; as well as some fellowships.

1960 Plan of Action and Future Prospects:

The 1960 Plan of Action involves the protection of 760,500 population still living under malaria risk. Spraying operations will involve 200,000 living in 157 villages.

Larval control will cover 161,000 persons.
Surveillance activities in the attack and consolidation phases will involve 574,500 persons.

It is anticipated that the 1960 operations will effect a total coverage for the first time. There is adequate national staffing of the programme apart from WHO advisory personnel.

The programme is expected to go into the maintenance phase in 1965.

PROVINCE OF EGYPT - UAR
(Preparatory Phase)

TYPE OF PROGRAMME

Eradication by stages covering three zones that will go successively, one year apart, under eradication measures.

PRESENT AGREEMENT

A comprehensive Plan of Operation is now in its final stage and is being negotiated with WHO and UNICEF. It is hoped that the agreement will be signed by mid-1960 to allow the eradication programme to start in Zone A in 1961 as scheduled in the plan of action.

PROGRAMME FOR 1960

A field training area representing the preparatory phase in Zone I has been selected in Giza and Imbabeh districts. This area has a population of nearly 283,900 inhabitants and will serve as a model training area for malaria eradication workers who will be assigned in Zone A during 1961. Already the Government has allotted US $64,800 to cover the expenditures in this field training area, and has provided all the personnel, supplies, transport and equipment, etc., needed for this programme. The eradication measures including spraying operations and surveillance activities will follow the same pattern as recommended in the Plan of Operation. Geographical reconnaissance was completed early this year and the spraying operation will start on 1 May 1960.

THE FUTURE MALARIA ERADICATION PROGRAMME

This programme based on eradication by stages will cover a period of ten years, involving 18.9 million population living under malaria risk, and will involve a total budget of LE.24.8 million, of which LE.19.6 million is borne by the Government. The difference, being the value of imported supplies, is LE.5.2 million. UNICEF has pledged to support this programme.

An important highlight of this programme is the development, by Presidential Decree, of a Malaria Eradication Board, headed by the Minister of Health and invested with full administrative and executive powers.

Another highlight is the establishment of a Health Education Section in the Malaria Eradication Service to mobilize the medical profession and civic organizations and the public to cooperate in this national programme.

It is gratifying to know that the Ministry of Health has taken advantage of the existence of the Regional Malaria Eradication Training Centre in Cairo, to train all the professional and the key auxiliary personnel at this Centre and at the same time established National Training Centres for the training of other categories of field personnel.

In developing this programme, the Egyptian authorities took advantage of the experience gained by other current programmes in the Region and are providing, from the outset, the administrative and financial requisites to make this Public Health undertaking a success.

L I B Y A

TYPE OF PROGRAMME

Eradication - total coverage basis involving a population of 31,000 mostly concentrated in Fezzan Oasis.

PRESENT AGREEMENT

The new comprehensive Plan of Operation was signed by WHO and the Government on 18 February 1960.

SPRAYING OPERATIONS

Control operations covered 20,000 population living in 27 villages where residual spraying was carried out with DDT 75% w.d.p. 2 grs.DDT Technical grade per sq.m. The total labour force employed consisted of 15 spraymen in three squads, each squad having a squad leader, 1 mixer and 5 spraymen. This operation was supervised by one field supervisor under the guidance of the ICA malariologist. Transportation of the squads was carried out by three pick-ups and one truck apart from the Jeep which was used by the field supervisor.

During 1960,the operations will be a combined spraying and larviciding operation involving a total number of 31,000 population under malaria risk. The system of surveillance will also be developed at the same time.

EPIDEMIOLOGICAL INVESTIGATIONS

A surveillance system is being established during the attack phase with a view to reduce the reservoir of the infection, an activity which by itself will greatly help the successful issue of the anti-mosquito measures. No data exist in this Office as regards the results of the laboratory examination of slides of blood specimens collected.

A.multicolor and A.sergenti are considered to be the malaria vectors of the country. The latter is rather limited in its distribution. Although A.multicolor has never been definitely proven to be a vector of malaria, yet it is regarded as such on epidemiological grounds. However, it is rather a poor carrier which needs a very high density to effect transmission of malaria. Both species are susceptible to DDT.

ADMINISTRATIVE AND FINANCIAL (Annex I, Table V)

The Malaria Eradication Service which is a joint activity of both the Ministry of Health and US-ICA, has its headquarters in Tripoli. The technical adviser provided by ICA directs the programme and is assisted by a WHO technician.

The National budget is US $70,000 and the programme is financially supported by ICA.

There is no apparent difficulty in reaching the goal of eradication due to the fact that the malaria problem is a limited one.