THE ROLE AND PARTICIPATION OF EUROPEAN COUNTRIES IN THE FIGHT AGAINST MALARIA IN THE WORLD

Report on a Conference

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1. Introduction

The Conference was held on the occasion of the celebration of the thirtieth anniversary of malaria eradication in Sardinia, in collaboration with the WHO Regional Office for Europe, the Government of Italy and the Regional Government of Sardinia.

The Conference followed on three recent meetings organized by the Regional Office on the subject of malaria, namely: WHO Working Group on Receptivity to Malaria and Other Parasitic Diseases (Izmir, September 1978), Coordination Meeting on the Prevention of the Reintroduction of Malaria in the Countries of the Western Mediterranean (Erice, October 1979) and Meeting on the Coordination of Antimalaria Activities in South-east Europe (Sofia, March 1980).

1.1 Commemorative ceremony

The Conference was preceded by an official commemoration on 20 October 1980 of the thirtieth anniversary of the completion of the most successful antimalaria campaign in Sardinia carried out by the Government of Italy and the Regional Government of Sardinia, with the assistance of the Rockefeller Foundation and the World Health Organization.

The commemoration, chaired by Professor L. Reale, President of the Italian Institute of Social Medicine, consisted of official greetings and addresses followed by a lecture by Professor U. Carcassi, Dean of the Faculty of Medicine and Surgery of the University of Cagliari, under the title "Malaria in Sardinia: a scourge that has disappeared".

A lecture and round-table discussion on the subject of health and social aspects of malaria in Sardinia took place at the Faculty of Medicine of the University of Cagliari. Professor S. Campus, Co-Rector of the University of Sassari, acted as Moderator.

1.2 Opening session

At the opening session on 21 October 1980, addresses of welcome were given by Professor S. Bettini, representing the Italian Ministry of Health, and by the representative of the Regional Government of Sardinia. Both speakers expressed the great interest of the host country in this important meeting and the hope that the discussions and recommendations of the participants would contribute to the progress of antimalaria activities all over the world.

In his introductory address to the Conference, Dr Leo A. Kaprio, WHO Regional Director for Europe, outlined the present problems of malaria in countries of the Region and made a number of important remarks. Extracts of Dr Kaprio's presentation of various aspects of malaria in relation to the needs and responsibilities of WHO are given here in extenso.

> "We are very thankful to the Italian Government for this opportunity to hold this WHO Conference in connexion with their own important celebration. We recognize that it was in Sardinia 30 years ago that an example was given to the world of how scientific knowledge, technical skill, good administration and strong national will could be joined together to reach a health goal of an island-wide eradication of malaria, an ancient scourge.
>
> We admire this early achievement with wide national and international implications, and have learnt much from it, for final success in conquering or curbing malaria in other parts of the globe.
>
> Two weeks from today, on 6 November 1980, the world will celebrate the hundredth anniversary of Laveran's discovery of malaria parasites. We may remember that day with humility because, in spite of all the modern scientific knowledge of malaria, we are still far from the eradication or even control of this disease in the world. We know that the epidemiological situation of malaria in many areas can be very complex because not only the biological factors are involved, but also many logistic and technical problems and especially socioeconomic conditions.
>
> In the European Region's situation, the risk factors of the renewal of transmission are related to movements of populations and to political changes. We now have in the Middle East a war, as a result of which the health situation will suffer and there could be again an increase in malaria incidence as we have seen so often in other wars and catastrophes in the past. Our concern with this menace has arisen not only because we have a special interest in our own Region, but also because we are committed to the worldwide improvement of health conditions.

We all know that, when malaria control programmes reach a reasonably advanced stage, surveillance mechanisms must detect the malaria cases speedily and effectively; this is possible only if the country has developed its infrastructure of health services to a level that forms a primary health care network, supported by the rest of the health services.

The primary health care concept involves participation of the population. Perhaps if I could be critical of some of the activities of the malaria eradication programme in the 1960s, it seems that we ran them too much like a military operation. There was little understanding among the population in some countries of why sprayings or other activities were carried out. No wonder that the people did not participate in these activities or even try to oppose them. There were deficiencies of the basic health structure to deal with surveillance, and we had setbacks whenever there were difficulties in the logistic part of the campaigns.

In many parts of the world, we add to the existing difficulties through technological development when various development projects, artificial lakes, dams and irrigation schemes are embarked upon without regard to the health situation, and man-made malaria is the result. Thus, old problems and badly planned modern technology of development have added to the natural difficulties. We also know how often the extension of urban areas can result in malaria epidemics at the periphery of the growing cities.

We have in the past been too optimistic about worldwide malaria eradication, and it seems that we have not paid enough attention to research. We thought that malaria eradication was round the corner and that no more research was needed, but in the last few years we came to the conclusion that we must develop new ways for the solution of our difficulties.

We may not always realize the extent and quality of human resources of Europe, and it would be useful to mention them here. Europe has still more medical students than the rest of the world together, and the resources of the 450 or so medical schools and other institutions are huge. This carries with it a responsibility to use this large network of scientists for the benefit of the whole world.

I have just come back from the thirtieth session of the Regional Committee of Europe, held in Fez at the invitation of the Government of Morocco. We had important discussions on the budget for the WHO European Region, but also on the future of our world in relation to WHO's distant goal of health for all by the year 2000. That goal has been defined as people's ability to live a socially and economically productive life and to take part in the development of their own society.

We are trying to pinpoint four major elements which should be the framework of every health programme. One is the fight against poverty. Let us not forget that malaria is often the disease of economic disinheritance, the disease of people who have no resources for using elementary health services. Until we have more resources available for all the people in the world, the problem of health for the future will find no solution.

The second element is people's behaviour. This is applicable to all societies, rich and poor. Alcoholism, tobacco and permissiveness contribute to physical and mental stress and have an adverse effect on the affluent society, adding to the problems of cancer, cardiovascular disease and other afflictions. That people's behaviour has an effect on many diseases of the tropics there can be little doubt.

The third element in the European programme calls for reduction of preventable causes such as traffic accidents, acceptance of vaccinations, avoidance of toxic elements in the environment and, generally, better care of the environment in which we live.

The final factor is the call for a more equable health care delivery system. Europe has its own oversophisticated and expensive system of hospital care, which is swamped by people who could be treated within the primary health care system. The availability of an easily accessible and widely used network of health units, less dependent on high technology, is badly needed.

Europe has the resources, the manpower, the institutions. We are still the richest part of the world, and we have enormous possibilities for cooperation with other countries within and outside our Region."

The Conference elected Professor B. Biocca Chairman, Professor F. Varnai and Professor M. Quilici Vice-Chairmen, and Professor L.J. Bruce-Chwatt Rapporteur. Dr K. Lassen acted as Secretary (see Annex VIII - list of participants).

1.3 Scope and purpose

In spite of the efforts being made within WHO's malaria action programme, this serious disease persists at an endemic level in many tropical and subtropical countries, giving rise from time to time to epidemic outbreaks of considerable extension and severity.

The growing interchange of populations between malaria-free (or freed) areas and those still malarious is responsible for the continuous increase in the number of malaria cases imported into European countries and causes serious concern, for the patients themselves, for the medical profession and for the health authorities, because of the possible epidemic focal resurgence of malaria in the receptive areas of the European continent and, particularly, the Mediterranean countries.

Thus, the promotion of a global and coordinated programme of malaria control is of crucial importance for all countries, as repeatedly recognized at recent World Health Assemblies (Annexes VI and VII).

The theme of the Conference was chosen in the spirit of resolution WHA31.45 of 24 May 1978, with special reference to subparagraphs 4(1), 4(6) and 4(7), and in view of the urgent need to stimulate the implementation of the malaria action programme which was recommended by the Assembly. The size and efficiency of such a programme will depend to a great extent on the resources which can be made available, as with the present means only focal and very limited activities can be carried out.

Much greater efforts should be made in order to secure:

(a) for European countries, the expertise needed in the malaria field:

- to organize and adjust, at national level, vigilance activities to the degree of malaria risk;
- to take, wherever and whenever required, preventive and/or remedial measures;
- to strengthen technical cooperation with countries where malaria is still a problem;

(b) for countries where malaria is endemic, to secure:

- the provision of technical personnel specialized in malariology and the conduct of programmes - a goal involving technical cooperation for which it would be advisable to make an inventory of the human resources available in the European Region and to study ways and means of increasing such cooperation in the field of antimalaria activities;

- the collaboration of European countries in the training of staff from countries with endemic malaria, either by establishing fellowships and posts in specialized institutions or by temporarily transferring teachers to universities in the endemic countries;

- the participation of European scientific institutions in fundamental and applied research, through international or bilateral technical cooperation agreements;

- the provision of financial backing for antimalaria programmes, in support of both operational activities and scientific research.

The Conference provided an opportunity for discussion and agreement on joint action and active participation of individual Member States, intergovernmental organizations and bilateral cooperation agencies in support of WHO's malaria action programme.

2. Present situation of malaria in the world and possible approaches for its control

2.1 Global problems and future prospects

Following the initial promising experience with DDT spraying for control of malaria in the early 1950s, wider use of this insecticide was made in many countries. Based on further experience, the idea of a more systematic attack on malaria matured little by little, leading to the development of the concept of eradication. The World Health Organization took a leading role in the development of the concept itself as well as in stimulating Member States to undertake malaria control. At the Eighth World Health Assembly held in Mexico in 1955, a resolution was adopted urging Member States to undertake public health programmes aimed at the ultimate eradication of the disease. Under the able guidance of the late Professor E. Pampana, first Chief of the Malaria Section and later Director of the Division of Malaria Eradication at WHO, the WHO Expert Committee on Malaria drew up in 1957 detailed guidelines for planning, implementation and evaluation of programmes. Soon after, many countries launched national malaria eradication programmes assisted by WHO and other international and bilateral agencies, such as UNICEF, UNDP and USAID.

It should be remembered that Africa, south of the Sahara, was not included in the global programme, since it lacked the necessary infrastructure to support it. However, throughout the 1950s and early 1960s, some 20 pilot projects were carried out in Africa, and it was even demonstrated that, in limited forest areas of Liberia and Cameroun, the transmission of malaria could be interrupted by DDT house spraying. Nevertheless, the time was not considered ripe for continent-wide action. The epidemiological studies undertaken more recently have demonstrated clearly that, in holoendemic areas of Africa, every person receives between 40 and 120 infective mosquito bites each year. For the purposes of comparison, it should be mentioned that in India, at the time the 75 million cases of malaria were reported each year, in most instances the average number of infective bites per capita per year was not higher than two.

In other parts of the world, with the exception of Amazonia, Brazil and some islands in the Pacific, one country after another initiated malaria eradication programmes and, by the mid-1960s, health administrators and policy makers were proud of the spectacular results achieved. Where programmes had been implemented, the endemicity level had been drastically reduced or eliminated. None the less, even at the time there were indications of malaria transmission persisting in some pockets. Reports of resistance of vectors to insecticides were on the increase as well as those on P. falciparum resistance to chloroquine, although much less attention was paid to the latter.

An analysis of the progress of malaria eradication was undertaken in 1966 by the WHO Expert Committee on Malaria, which concluded that, in spite of difficulties of a technical, operational and administrative nature, 66.5% of the population of the 42 countries carrying out malaria eradication programmes lived in areas with good prospects for final eradication, while 24.4% lived in areas where modification of the plan of operations was required. Only 3.7% lived in areas where drastic changes were required if the programmes were to succeed. If the situation was reanalysed today, we would undoubtedly find that the Expert Committee was over-optimistic. Perhaps too much emphasis was placed on operational coverage by house spraying and surveillance operations in the hope that if 95-99% coverage could be achieved, the transmission would be interrupted. We know now that, in many areas, 50-60% coverage would have been sufficient to interrupt transmission, although in other areas (limited in number) a 99% coverage would not have been sufficient to achieve it.

As the progress of some programmes slowed down, evaluation of some of them was carried out and led to the development of a revised strategy for malaria eradication, proposed by WHO and adopted by the Twenty-second World Health Assembly in 1969.

In spite of the epidemiological logic of the revised strategy, which should have facilitated the efforts of countries to place their malaria programmes on a realistic footing, it did not provide the remedy expected for the simple reason that it was not implemented in the spirit in which it was proposed.

At the beginning of the 1970s, countries affected by malaria had to face many difficulties, such as the overall economic crisis, the increase in petrol costs, insecticides, drugs, equipment or in wages, plus other health priorities and the problems already being encountered by the malaria programmes, i.e. technical, operational and administrative. Under these circumstances and with the reduction in efforts to control the disease, its resurgence was, as already stated, inevitable. Indeed, during the period 1972-1976, an average 2.3-fold increase in the total number of reported cases was recorded. In some countries, this increase was in epidemic form (Sri Lanka, Turkey). The number of microscopically confirmed malaria cases reported by Member States in the different WHO Regions is shown in Table 1.

Table 1. Number of malaria cases[a] (in thousands) reported during the period 1972-1979, by Region

Region	1972	1973	1974	1975	1976	1977	1978	1979
Africa[b]	3 995	6 662	5 120	4 136	5 212	4 353	5 330	2 451[e]
Americas[c]	285	280	269	357	379	399	465	432[e]
South-east Asia[c]	1 816	2 686	4 162	6 059	7 296	5 552	4 264	3 192[e]
Europe[c]	13	9	7	13	41	119	93	33[e]
Eastern Mediterranean[c]	830	746	480	424	347	227	126	133[e]
Western Pacific[c]	171[d]	201[d]	179[d]	188[d]	211[d]	4 464	3 422	2 690[e]
Total (excluding Africa)	3 115	3 922	5 097	7 041	8 274	10 761	8 370	6 480

[a] The information provided does not cover the total population at risk in some instances

[b] Mainly clinically diagnosed cases

[c] Microscopically confirmed cases

[d] Excluding China

[e] Provisional

Figures for Africa, south of the Sahara, are not included in the totals. However, Member States of this continent regularly collect information on malaria which they send to WHO. During the period 1972-1976, the yearly average ranged between 3 and 6.5 million cases reported, but, in most instances, these cases have not been microscopically confirmed, nor have the reports covered all malarious areas. On the other hand, some antimalaria activities are being carried out, which are integrated into the existing health services. In some cities, municipal services are undertaking vector control operations, while island countries have more advanced programmes aimed at ultimate eradication of malaria (Cape Verde, Sao Tomé and Principe, La Réunion). In Mauritius, malaria was eradicated some years ago, but, following two cyclones and because of the imported parasite reservoir, a few foci of active transmission were detected in late 1979 and early 1980.

As far as the rest of the world is concerned, it is difficult to make an analysis on a country-to-country basis. At the initial stage of the "global" eradication programmes, emphasis was placed on the "population protected" except for areas in the "consolidation" and/or "maintenance" phases. Secondly, the efficiency and accuracy of surveillance operations varies from country to country, and it is not possible to make a comparison in absolute terms. However, within each country, the coverage and efficiency of case detection has remained the same in the last few years, and the figures contained in Table 1 could be considered as representing the general trend.

An attempt at analysing individual country data for the past ten years clearly shows that there is no regularity in either the increases or decreases in the number of cases during that period. However, it is evident that the reduction in the number of cases is not due to insecticide spraying measures applied by the countries concerned. From that point of view, the general trend has not been in proportion to the efforts made by countries to control the disease.

A few years after the initiation of malaria eradication programmes, the endemicity, at least as far as its original level is concerned, was eliminated. As would have been expected, P. falciparum infections were the first to disappear and, in most instances, were reintroduced more massively during the period of resurgence. The reduction in P. vivax infections followed a much slower pace and, what is even more important, infections with that species were detected in areas in which the transmission of malaria had been interrupted. This was particularly noticeable in countries of Latin America.

The global trend in the annual number of reported cases of malaria (with the exception of Africa and China) for the period 1972-1979 shows an increase from about 3 million cases to a peak

of nearly 8 million cases in 1976, followed by a decrease to just under 4 million cases in 1979. The peak and the subsequent decline are largely due to the reported numbers of cases of malaria in South-east Asia generally and India in particular.

A resurgence of malaria affected a number of countries during the period 1972-1976. The causes of this resurgence are complex. It is true that the part played in the malaria eradication programme by the general health infrastructure of the countries concerned has been underestimated. On the technical side, too much reliance was placed on the application of residual house spraying in the belief that a single method used would lead to the interruption of malaria transmission under any ecological conditions. As many programmes had to continue beyond the original target date and engage a considerable amount of resources to cope with the complex, technical, operational and administrative problems encountered, many countries reduced their efforts to control the disease and a resurgence was, therefore, inevitable. In many instances, the premature withdrawal of international and/or bilateral assistance accelerated the process of resurgence.

As from 1977, the overall trend of reported cases of malaria shows a decline, which is influenced by some improvement of the situation in Turkey, India and Sri Lanka.

The overall situation of malaria according to the level of risk, by WHO Regions for 1978, is shown in Table 2.

Although no detailed stratification of the epidemiological potential has been carried out recently in each country of the Regions concerned, sufficient information exists to allow a classification of different areas into those with minimum risk and those with moderate and high risk.

As will be seen from the table, three-quarters of the total population of the world in countries and areas in which malaria was endemic originally lived in areas with moderate to high risk. That, in itself, indicates the overall risk for the world.

Table 2. Summary of malaria situation according to level of malaria risk (as at mid-year 1978), by Region (population in millions)

Region	Total number of countries or areas	Estimated population[b]	Countries or areas where malaria was endemic[a]							
			Total number of countries or areas	Population originally at risk	Risk nil		Risk minimum		Risk moderate to high	
					Countries or areas	Population	Countries or areas	Population	Countries or areas	Population
Africa	47	336.18	43	292.65	2	1.37	3	9.73	38	281.55
Americas	49	586.50	34	220.17	12	73.21	4	15.44	18	131.52
South-east Asia	10	992.02	8	918.72	0	-	0	-	8	918.72
Europe	38	822.57	17	376.22	14	309.67	2	23.34	1	43.21
Eastern Mediterranean	24	249.20	23	224.14	4	5.72	4	48.95	15	169.47
Western Pacific[c]	38	303.57	18	98.03	5	10.79	2	13.33	11	73.91
Total	206	3290.04	143	2129.93	37	400.76	15	110.79	91	1618.38

[a] Taking 1947 as reference year

[b] Based on United Nations monthly Bulletin of Statistics, Vol. 33, No. 7, 1979

[c] Excluding China

Under the circumstances, one wonders what the ultimate prospects will be if programmes continue to be carried out the way they are at present. For understandable reasons, to respond to the resurgence of malaria, national services applied the same methods and tools that had given spectacular results in the mid and late 1960s. As experience has shown, this did not bring about the interruption of transmission everywhere. It is reasonable, therefore, to speculate that without technical reorientation of antimalaria activities, the declining trend observed globally will level off and, if the political support fades out, within a few years we may witness another resurgence which will be more difficult to cope with than the preceding one, since technical, operational and administrative problems may increase in intensity.

The analysis of operational and epidemiological data clearly shows that, in many countries, the operational application of insecticides and antimalaria drugs has been organized taking into account their potential effectiveness rather than the epidemiological characteristics of different areas. In other words, too little attention has been paid to the natural pattern of malaria transmission, and spraying operations have been carried out at six-monthly intervals, irrespective of the seasonality of intensive transmission. Surveillance operations were reduced in many instances to the collection of blood samples from the population in order to satisfy the statistical requirements rather than to follow up fever as a screening device. Admittedly, malaria eradication programmes have been based on the application of a single and simple method that should lead to the interruption of transmission, supported by surveillance activities. Nevertheless, it is now clear that, without the epidemiological approach, no substantial progress can be expected.

Such an approach means selection and application of antimalaria measures corresponding to the natural pattern of transmission and based on a good knowledge of the bionomics of the local vector, environmental (often man-made) conditions, response of local species and strains of the parasite, and the activities, habits, customs of the human community, etc.

Before selecting methods of control, we have to ask ourselves what efforts and specific measures would be needed to maintain the status quo in areas where transmission has been interrupted. Is the effort compatible with the country's potential in providing health protection to the population? Health administrators responsible for malaria control have to cope with a number of important problems; yet there are ways and means to accommodate all necessary provisions within a reasonable plan.

Taking into account the concept of the "epidemiological approach", it is clear that no general directive can be given for the selection of the method(s) of control. There are, however, certain principles that should be adhered to, as follows:

(a) environmental measures (e.g. regulation of water streams or elimination of stagnant water collections) should, wherever possible, be preferred to the use of chemicals; while these measures may not be sufficiently effective, they can considerably reduce the vector density;

(b) biological means of control (carnivorous fish or biological agents) should be used as additional measures wherever applicable;

(c) the use of insecticides as residual indoor spraying or for space spraying should be rationalized and the timing of their application adjusted to the local natural pattern of transmission;

(d) the administration of antimalaria drugs in communities should always be accompanied by the monitoring of the sensitivity of local species to different drugs;

(e) whatever method of control is selected, permanent evaluation must be applied flexibly, taking into account the local specific features of malaria endemo-epidemicity.

The prospects for malaria control/eradication are in the hands of the policy makers, health administrators and malaria specialists. One should also not forget the contribution of the scientific community, which can accelerate the progress of control activities. Recent experience in relation to the resurgence of malaria shows that, in countries in which the resurgence prompted political reaction and support, the remedial measures undertaken resulted in a reversion of the epidemiological situation.

Generally, the prospects for malaria control in Asia and Latin America are good. Of course, we should not forget the inaccessible pockets on both continents and the real hard core problem areas. National services have at their disposal a strategy with tactical variants which, if flexibly applied using the epidemiological approach, should lead to the attainment of the

objectives established by governments. There is also a whole range of methods and tools which, although far from perfect, can undoubtedly greatly reduce the burden of malaria and, in many cases, eliminate the disease.

European countries can contribute considerably to improving the prospects for malaria control/eradication in the world. In terms of the north-south dialogue, Europe can cooperate in the development of national expertise in countries with endemic malaria. The contribution of the scientific community of this continent already represents more than 50% of all research being carried out in the field of malaria, and it is hoped that this will even increase in the near future.

In spite of the many difficulties countries have to face, we still have time to redress the situation, but this would require, in addition to political, financial and administrative support, "expertise" and the intelligent application of available methods and tools through the epidemiological approach, based on applied research which must be an integral part of every malaria control programme. Experienced malariologists and scientists from Europe can considerably contribute to malaria control in countries of the Third World.

2.2 The role of research in malaria control

Many advances made during the past 20 years, in biological sciences in general and more particularly in biochemistry, genetics and basic immunology, have greatly contributed to the increase in our knowledge of plasmodia, their vectors and the reaction of the host to the infection. Two major technical problems are causing great difficulty when it comes to malaria control. These are resistance of some species of anophelines to insecticides and resistance of *P. falciparum* to 4-aminoquinolines and to proguanil and pyrimethamine.

Resistance of *P. falciparum* to paludrine (proguanil) was first reported as early as 1949 from India, Indo-China and Malaysia, followed by reports on pyrimethamine resistance of the same species from East Africa in 1953. Resistance of *P. falciparum* to chloroquine has been known since 1957 (Thailand) and was later reported from Colombia in 1960.

In spite of the tremendous efforts made towards the development of new compounds, there are not many drugs available. During World War II, some 14 000 compounds were screened and tested by the United States army programme, and in the last 15 years some 250 000 compounds were reviewed or screened and tested within the same programme. This enormous programme of drug development brought to light only five compounds, one of which (mefloquine) may possibly be available in three to four years from now. It is difficult to predict the fate of the Chinese drug *Qing hao su*, but it will not be a "miracle" drug; nor will it become available in less than four to five years. Thus, in areas with *P. falciparum* resistance to chloroquine, national services will have to use other existing drugs. However, if the compounds available are utilized as rationally as possible, chemotherapy can fulfil the role it is expected to play in prophylaxis and in malaria control.

In order to prevent the consequences of the spread of *P. falciparum* resistance to chloroquine, a monitoring system has been established. For this purpose, WHO has organized many courses to train nationals of some 50 countries in the *in vitro* "macro" and "micro" techniques for testing of the susceptibility of *P. falciparum* to commonly used drugs and provides countries with test kits developed for this technique. This activity is progressing well, but one must not forget that the testing of susceptibility *per se* should not be considered as monitoring of drug resistance. To monitor correctly drug resistance in *P. falciparum*, two other aspects are of importance: the characterization/identification of isolates of resistant *P. falciparum* and the concomitant testing of the response of isolates to other available antimalaria drugs and their combination.

In relation to strain characterization, the identification of specific enzymes has already shown promising results. This technique should be further explored as it may have epidemiological importance in connexion with the ability of different species of anophelines to support the sporogonic cycle of plasmodia from different geographical areas.

The identification of strains is not only of academic interest, since the response to antimalaria drugs is one of the characteristics of "strains" of plasmodia. With the present potential offered by biochemical and genetic techniques, we should gain a much better insight into the different survival mechanisms of plasmodia.

Biochemistry has also contributed considerably to our better understanding of the mechanism of physiological resistance of anophelines to insecticides, as well as to the ability of some species to support the sporogonic cycle, again very important for the epidemiology of malaria in various parts of the world.

The initial favourable experience gained with DDT, not only in public health but even more so in agriculture and veterinary medicine, stimulated considerable scientific progress in the development of synthetic chemical pesticides. For over 30 years, the World Health Organization alone has tested nearly 2000 compounds belonging generally to four groups of chemicals. However, in the last few years, the number of compounds requiring testing has diminished. In fact, it is unlikely that there will be new developments in the foreseeable future for the simple reason that the number of pesticides available for use in agriculture (the principal utilizer of these compounds) is sufficient. The requirements of public health are less important as far as quantities are concerned. It is known that the use of pesticides in agriculture contributes substantially to the spread of resistance of malaria vectors to insecticides and, while crops are protected, the same pesticides may not be efficiently protecting man, who is, after all, the main actor in agriculture. However, there is a choice of insecticides at our disposal although, in many instances, their price is prohibitive. One should also consider that the future of malaria control must not be based exclusively on house spraying with residual insecticides but on a combination of bio-environmental measures, chemotherapy and chemical control of vectors.

In the field of malaria immunology, great progress has been made in the last 20 years. Practically all developmental stages of plasmodia have been explored, using animal models as immunizing agents, either by irradiating some stages or by attenuating them in different ways. More recently, the hybridoma technique has been investigated with some success, but attempts were also made using non-specifics such as *Corynebacterium parvum* or even glycolipids inserted into liposomes. Our understanding of how the humoral immunity functions is reasonably good, but the role of cell-mediated immunity still requires further research. Several serological tests developed in the last 20 years have contributed to our recognition of antigenic variations in plasmodia. The possibilities for continuous *in vitro* cultivation of plasmodia allowed considerable advances in research on immune phenomena. Some years ago, it seemed that the development of a malaria vaccine was imminent, but, in spite of the excellent results obtained in animal models, it is difficult to predict when a vaccine will be available for malaria control. Even when developed, it will not be a universal panacea for malaria control, and additional vector control operations will be required.

Research on other phenomena linked with plasmodia infections has provided new knowledge on genetic disorders of the blood, anaemia, immune complexes (auto-immune disease), etc. In relation to the biology and physiology of the vector, much information has also been acquired. New methods have been developed for the application of chemicals as well as some promising biological agents, which are being tested, such as *Bacillus thuringiensis israelensis*. Certainly some of the knowledge acquired and the experimental explanation of certain phenomena may not be of immediate practical use, but their relative importance cannot be ignored. When comparing the vast amount of knowledge accumulated, it seems that it is not commensurate with its limited applicability to malaria control. However, it usually takes time between the development of any scientific knowledge and its application. We must, therefore, encourage national services to undertake applied field research as this should accelerate the bridging of the gap between technological development and its wider use for control of malaria.

Several scientific institutes in Europe are already engaged in basic research on malaria either through cooperation with the special programme for research and training in tropical diseases or through agreements with other funding agencies. These efforts should continue and should be accompanied by a revival of interest on the part of the pharmaceutical and chemical industries.

However, it has to be realized that time is required for the development of a potent vaccine, drug or insecticide. Moreover, it is pertinent to stress the fact that the discovery of new tools, even if their use will be of great value, will not be sufficient *per se* to eliminate malaria, a disease which is so deeply rooted in countries with prevailing unsatisfactory socioeconomic conditions.

2.3 Applied field research

Applied field research can play an important role, not only in clarifying epidemiological situations and testing tools and approaches for more effective malaria control, but also as a central element in a chain leading to the promotion of health programmes. Problems for which field applied research may provide answers may be found at various levels of the planning and implementation of malaria control such as:

- the identification of the malaria situation through the study of various factors intervening in malaria transmission and of their interaction;
- the selection and definition of objectives and control strategies - which implies feasibility studies and simulation exercises;
- programme implementation often means operational research, i.e. study of alternative measures and approaches;
- programme evaluation - which refers to study of the accuracy and significance of statistical measurements and cost-benefit analysis, when applicable.

In some ways, applied field research for determination of malariogenic potential may be regarded as minor field research. The following example illustrates this: the determination of the malariogenic potential is of special importance in an area where the risk of importation of malaria exists. Naturally, the degree of this risk will depend on the level of receptivity.

Where the receptivity is high in an area of stable malaria, the source of infection can give rise to an epidemic unless the introduced cases are rapidly detected and eliminated. The receptivity of the area (in terms of a high anopheline density) should be decreased as much as possible by antimosquito measures.

Where the environmental conditions in an area of unstable malaria are favourable for an increased level of transmission, the detection of the malarious foci should be carried out with speed and efficiency, and insecticide spraying must be carried out as a preventive measure. In any case, monitoring of vector densities through a system of entomological surveys is necessary to assess the changes of vector densities.

Important priority areas for applied field research have been identified by the special programme's scientific working group on applied field research in malaria. Reports of the meetings of this group are widely distributed throughout the world. Answers to the questions arising are often prerequisites for any meaningful progress in the control of the disease. Constraints in fostering field research are numerous. In particular, there is an acute shortage of national scientists capable of setting up, constructing and supervising field research projects; in addition, day-to-day activities in the government services are often so demanding that the required sustained attention to research cannot be kept up to standard without prejudice to the running of the operations. National antimalaria programmes should, therefore, receive sufficient incentives and resources to allow provision for research activities, in particular through budget, training and career structure for research workers. Obviously, the special programme can only cover a limited portion of the needs and, therefore, alternative sources of funding should be sought. A mechanism is, however, required to ensure proper coordination and to avoid duplication.

3. Malaria situation in the WHO European Region: achievements, present status and future prospects

The WHO European Region covers a geographical area that extends from Greenland to Vladivostok in the USSR and from the North Pole to North Africa (Annex I). It comprises 33 countries with a population of approximately 800 million (Annex II).

In three of these countries, namely Algeria, Morocco and Turkey, there are localities where malaria transmission still goes on. This is a situation of endemic malaria of the focal type in which, when conditions are suitable, epidemics may and do explode, as has happened in Turkey during the last three years.

In most of the remaining countries, malaria transmission was brought to a halt years ago, with or without outside help; there, malaria has been eradicated, and eradication has been certified according to WHO criteria (Annex III).

The mosquitos themselves, the vectors of malaria, have not been eradicated anywhere, and whenever parasites are brought in and conditions are suitable, malaria transmission may and indeed does start again, as happened some time ago in Sicily (Italy), Corsica (France) and Thrace (Greece). In these countries, the health authorities have the means to bring any occasional transmission to cessation.

The beginning of the seasonal transmission cannot be predicted, although in some cases it may be foreseen. Whenever the mosquito vectors are present, there is the possibility of the renewal of malaria transmission. The situation of reported imported cases is shown in Table 3.

Table 3. Imported malaria cases reported - Europe

Country	1972	1973	1974	1975	1976	1977	1978	1979
Albania	1	0[a]	0	0	1	3	0[a]	–
Austria	13	7	6	11	31	33	94	35
Belgium	3	22	3	1	1	3	0	1
Bulgaria	8	13	32	45	60	90	101	101
Czechoslovakia	7	2	8	9	6	4[a]	6	–
Denmark	28	38	59	62	46	49	54	–
Finland	4	4	16	4	22	2[a]	12[b]	13
France	8	43	58	143	197	232	494	25
German Democratic Republic	–	3	6	11	4	17	18	22
Germany, Federal Republic of[c]	134	146	105	175	218	337	534	486
Greece	37	20	21	27	33	39	64	35
Hungary	4	6	5	8	2	4	8	13
Ireland	1	2	2	1	6	58[d]	11[e]	32
Italy	62	56	60	56	103	205	101[a]	162
Malta	0	0	0	2	0	0	0[a]	0
Netherlands	19	30	27	54	76	107	108	112
Norway	–	13	0[a]	25	56	12[e]	20	32
Poland	3	8	12	18	19	27	35	23
Portugal	584	594	903	971	482	133	52	45[c]
Romania	8	3	3	10	7	17	17	13
Spain	19	34	20	30	39	57	32	52
Sweden	27	49	52	59	62	78	79	104
Switzerland	5	11	37	85	49	48	112	93
USSR	211	226	272	275	310	350	408	399
United Kingdom	336	539	660	765	1217	1528	1909	2053
Yugoslavia	14	15	20	20	42	65	50	55
Total	1536	1884	2387	2867	3089	3498	4313	3912
Deaths	34	42	19	25	13	28	40	9

[a] 1st semester

[b] Including 2nd semester 1977

[c] Including relapses

[d] Including 1st semester 1978

[e] 2nd semester

Malaria has been eradicated in countries or national territories of the European continent, but the African and Eastern Mediterranean Regions, immediately bordering on the European Region, have countries where malaria transmission continues, thus creating a situation fraught with potential danger. As the mosquitos that carry malaria do not respect the borders of WHO Regions, their geographical distribution is frequently continuous, and several border countries may constitute one large epidemiological area, such as in the case of Iraq, Syria and Turkey.

In the Mediterranean basin, a relatively small body of water, there are neighbouring countries, some with malaria transmission, some without.

Malaria remains a major public health problem in the African, Asian and Eastern Mediterranean parts of the American and Western Pacific Regions of WHO. In an age of rapid communication, these regions can no longer be considered to be very far from Europe, and the malaria problem there indirectly adds to the malaria problem of the European Region.

In the European Region, there is sufficient knowledge of the mosquito vector, of the parasites and of the human and other environment. Furthermore, modern scientific developments offer a variety of adequate means that, used singly or together, would make it possible to stop transmission and even eradicate malaria in the near future. However, the countries that are now fighting malaria in the European Region also face pressing political, social, economic, health and other priorities. For the time being, they cannot provide enough trained people, sufficient foreign currency to buy equipment, supplies and transport, and adequate services to keep the country malaria-free once eradication has been achieved. It is not surprising, therefore, that they cannot develop the political impetus to embark on a costly and intensive campaign. This is also true for malarious countries of neighbouring regions. With the means they have now, the countries can only hope to keep malaria down to a level where it is not a major health problem. Their immediate aim is to save lives and to reduce suffering and economic losses.

Another aspect of the situation menacing all the countries of the Region is the importation of malaria parasite carriers.

Rough estimates indicate that approximately 300 million people are expected to visit Europe in 1980 from other regions. There are approximately 13 million migrant workers in central and northern Europe who have come from southern Europe and North Africa. There are around 2 million Turkish workers in the Federal Republic of Germany. The trans-Saharan road connects African countries south of the Sahara to the Mediterranean shores, passing through Algeria.

There is evidence that infected anopheline mosquitos entered an aeroplane in Africa, were carried to an airport in Europe and, on arrival, transmitted malaria to a bystander.

Other and numerous reports show that people from Europe who have been in malarious areas in other regions for various reasons (tourism, work, study) have been infected there and have returned home carrying the parasite with them, sometimes without knowing it.

The fatality rate of P. falciparum malaria in non-immunes is of the order of 4%-6%, and this constitutes a serious medical and public health problem. Usually, the death of these patients is due either to a delayed diagnosis of acute P. falciparum infection or to inadequate treatment.[a]

Reports of seafarers infected with malaria in Africa who died on their ship before arriving at their European port of origin are frequent and indicate a special occupational hazard.

The Member States periodically send WHO information on imported malaria cases as they are reported to their central statistical services. This information is transmitted to WHO headquarters in Geneva for publication in the WHO Weekly epidemiological record. The records give the reporting country, the number of imported cases, the parasite species, the country in which presumably the infection was contracted and the number of deaths (if any). There is some evidence that for many reasons these reports, always given according to the best of available information, represent an underestimate of cases of imported malaria in comparison with true incidence, which is difficult to verify. Weekly epidemiological record No. 26 of 27 June 1980 indicates that in the European Region (excluding Turkey) the imported cases of malaria numbered 3441 with 28 deaths in 1977 and 4217 with 26 deaths in 1978. This apparently small number of cases, in comparison with other prevalent communicable diseases, must be seen in its proper light, as a growing medical and health problem related to the steady increase of human mobility and as a challenge to health authorities of all countries concerned.

One could argue: what are 4217 cases and 26 deaths in a population of about 800 million? The trouble is that if any one of us happened to be included in these numbers, we would not care at all about statistics, but would think rather that these events in the twentieth century in Europe just should not happen!

Another problem is that of cases of malaria that are "induced", as may happen through blood transfusion.

The problem of induced malaria, generally due to blood transfusion from an infected donor, is well known and likely to arise anywhere in the Region. These induced cases still occur, and the WHO Coordination Meeting on Prevention of the Reintroduction of Malaria in the Countries of the Western Mediterranean, held at Erice in October 1979, made the following observations in this respect.

[a] In the United Kingdom, out of the total of 2053 cases of malaria reported in 1979, there were 435 infections with P. falciparum and five deaths. This gives a fatality rate of 1.2%, a considerable improvement from the former rates between 3% and 4%.

(a) The possibility of contracting malaria through blood transfusion is not exceptional. It is well known that in malaria carriers parasitaemia may persist for several years. The possibility and the frequency of malaria infection after blood transfusion depends, of course, on the species of plasmodium involved.

(b) In the case of P. falciparum, the infection usually disappears after one year, although in immune subjects the parasite may remain in the blood for a longer time without giving any clinical signs.

(c) In the cases of P. vivax and particularly of P. malariae, the situation is completely different, because these species may persist for several years, and there are numerous post-transfusion cases caused by malaria parasite carriers who left endemic areas 20 or 30 years previously.

(d) It is important to know that malaria may be acquired after a blood transfusion, not only for the sake of the patient involved, but also from a public health point of view, because asymptomatic parasite carriers may be the cause of the resurgence of transmission in a country or region where malaria has been eradicated.

(e) There is an easy solution to this problem because it is possible to detect infected donors through systematic serological tests and to administer schizonticidal treatment to those who are found to be positive or to recipients of blood, when malaria infection of the donor may be suspected.

In addition to the two main problems, namely that of transmission of malaria in some countries and that of imported and induced cases, there are other problems, either of a technical nature, the solution of which requires concerted international efforts and research, or related to human behaviour.

In the first group, there are problems such as:

- resistance or increased tolerance of mosquitos to the available insecticides (an actual and potential problem in the Region);
- the possibility of importation of P. falciparum strains resistant to chloroquine;
- the possibility that African strains of plasmodia may be transmitted by anopheline vectors common in the European Region of WHO;
- adverse side effects of 8-aminoquinoline group of antimalaria drugs on G6PD enzyme-deficient people, a problem existing in Turkey at present;
- the relationship between drug addiction and induced malaria through indiscriminate use of syringes;
- the toxicity of insecticides to humans, to animals and to the environment;
- the difficulty of defining, under given epidemiological circumstances, the optimal strategy to stop transmission, using measures that are cheap, safe, effective, available and acceptable;
- the problem of administration of antimalarials at regular intervals to nomadic groups of people or to migrant labourers.

In the human behaviour group, some of the most important problems are:

- the ignorance and indifference of many travellers as regards available measures to protect their own health (prophylaxis); late reporting of illness probably acquired abroad and follow-up of treatment;

- the inadequacy of health care systems, particularly at primary care level, to cope adequately with imported diseases (lack of training, of diagnostic facilities and of treatment means);

- the disregard in implementing international quarantine measures such as disinsection of aircraft and ships and notice to travellers;

- the lack of coordination between departments within ministries of health (e.g. for communicable diseases and primary health care), between ministries (e.g. for health and the environment), between governmental and private agencies (e.g. on the use of insecticides for pest control);

- the refusal of people to accept the small degree of bother caused by periodic indoor residual insecticide spraying.

There is no denying that malaria is a public health problem for all the countries of the European Region. Each country has this problem in varying degrees of importance. Each country must solve its own problem at home, but it is in its own interest to help those countries that are worse off, because it is from there that the problem stems. It is also true that international organizations, including WHO and others in the United Nations system, have responsibilities and functions in the fight against malaria, each within the framework of its mandate.

An excellent example of such enlightened cooperation of countries of the European Region is the prompt and generous response to the appeal launched by the WHO Regional Director for Europe, on behalf of the Turkish Government, to provide assistance to that country when the malaria epidemic broke out in 1977.

In 1978, the donations in cash (foreign currency) and kind reached the figure of approximately US $4 million. Thanks to this prompt intervention and to the exceptional efforts made by the Turkish Government, the epidemic was stopped. Although the state of emergency is over, the situation is still critical, and some countries are continuing to support, in great humanitarian spirit, the desperate battle that the country is still fighting with courage and dignity.

UNDP, for instance, is financing a continuing project for the coordination of antimalaria activities in the south-eastern part of the European Region. Within this project, close coordination has been established among Bulgaria, Greece, Iraq, Syria, Turkey and Yugoslavia, and it is hoped that other countries will also join in.

There is a wealth of expertise in the European Region in all aspects of malariology, including epidemiology, entomology, parasitology, immunology, chemistry, physiopathology, diagnosis, treatment, prevention and control. The long history of discoveries, teaching, research, control and eradication of malaria has been built under the aegis of institutes, many of which are world famous and located in the European Region. The Council of European Schools and Institutes of Tropical Medicine and Hygiene has already contributed to a new spirit of cooperation between Europe and the developing tropical countries and will hopefully provide more cooperation.

In the field of training and research, there is still a great potential of resources which have not been fully utilized and could greatly help in the fight against malaria in the European Region and in the rest of the world.

The WHO Regional Office for Europe has a limited number of professional staff (about 50) and a relatively small budget (US $12 million in 1980). There is, however, an intercountry malaria team composed of a malariologist, an entomologist, an engineer and a sanitarian. The team is based in Turkey for obvious reasons and is financed partly by the WHO regular budget and partly by the budget provided by UNDP for the intercountry coordination project in south-east Europe. In spite of its limitations in personnel and funds, especially for the malaria programme, the Regional Office has been able to organize several activities in the last few years, including 35 consultant missions and 6 major technical meetings:

Consultant missions		Major technical meetings	
For Turkey:	5 in 1977	In 1978:	1 in Izmir, Turkey, and 1 in Copenhagen
	10 in 1978		
	7 in 1979	In 1979:	1 in Erice, Italy, and 1 in Turkey
	1 in 1980 (up to July)	In 1980:	1 in Sofia, Bulgaria, and 1 in Cagliari, Italy (the present meeting)
For Algeria:	3 in 1977		
	4 in 1978		
	3 in 1979		
For Morocco:	1 in 1978		
For Greece:	1 in 1978		

In addition to these activities, the WHO Regional Office for Europe provided support for four periodic border meetings (1977 in Istanbul, 1978 in Riad, 1979 in Amman, 1980 in Turkey). A total of eight fellowships have been provided (six to Turkey, one to Algeria, one to Morocco).

The regional malaria programme is closely coordinated with the programmes of other relevant units, such as primary health care, environmental health protection, appropriate technology for health, health manpower development, health information, and research.

The programme is supported by 12 collaborating centres in Europe, located in Belgium, Italy, Portugal, Romania, the USSR, the United Kingdom and Yugoslavia. The WHO Panel of Experts on Malaria is also available for support.

The programme is closely linked to and receives strong support from WHO headquarters programmes, particularly the malaria action programme, the vector biology and control programme, and the special programme for research and training in tropical diseases. Collaboration is very close with other WHO regional offices, especially that serving the Eastern Mediterranean Region. It is also linked with and supported by UNDP (particularly through the UNDP resident representatives), UNICEF, WFP, other intergovernmental and nongovernmental organizations and the Council of European Schools and Institutes of Tropical Medicine and Hygiene.

During the malaria emergency in Turkey over the last three years, the Regional Office has managed the whole operation of accounting of donations, purchasing and delivery of equipment and supplies, recruitment and briefing of personnel and consultants.

The malaria unit is also responsible, after receipt of periodical information from countries, for its review and elaboration and its presentation to countries, to the Regional Committee and to WHO headquarters for use by the Executive Board and World Health Assembly and in the Weekly epidemiological record.

Furthermore, the unit is engaged in planning, implementation and evaluation of the malaria programme, using internal managerial tools such as programme and country profiles, medium-term programmes and the general programme of work of WHO.

4. Training facilities for malaria existing at European schools and institutes of tropical medicine

4.1 Training needs

The realistic approach to a national malaria control programme should be based on the adjustment of activities to local epidemiological conditions and available resources. Objectives and targets of achievement must be set up, and be regularly revised in the course of programme implementation, following periodical reappraisals and reassessments of technological advances. The first step is, therefore, a redefinition of clear and realistic objectives of antimalaria operations in the light of technical, operational and administrative constraints. To do this, a multidisciplinary group of specialists is needed; this expertise is very scarce at present.

During the eradication era, the discipline of malaria control, which had slowly and painfully developed from the beginning of the century to a high degree of sophistication just before the Second World War, was converted to the rather simplistic technology of malaria eradication.

A new generation of technicians was trained to apply a single weapon - the spraying of residual insecticides on to the interior walls of premises - as this was believed to be sufficient to lead to the eradication of the disease worldwide with the exception of Africa, south of the Sahara. It was considered superfluous and uneconomic to study the bionomics of the mosquitos, the biology of the parasite and the numerous human behavioural, cultural, social and economic factors, which contribute so much to the variability of the disease under the varied prevailing local conditions.

The decision to revert from eradication to control did not redress the situation, since few control-oriented malariologists had been trained during the last decade.

It must be admitted that the training of specialized personnel previously carried out at six international malaria eradication training centres came practically to an end in 1969, when these institutions were closed down. As a substitute for this highly successful training, postgraduate courses were initiated in a few institutions but were less than satisfactory in producing the required expertise for the revised global programme.

The lack of training facilities, which has resulted in the present acute shortage of expertise, had a detrimental side effect on applied field research aimed at finding answers to local problems related to the epidemiological factors involved. The most meaningful applied field research is done within an antimalaria programme, but neither of them can be adequately executed in the absence of trained personnel. In countries where malaria control programmes already exist, stimulation of such research should be a priority and would be efficacious for the campaign. In countries where a malaria control programme exists but is inadequate and urgently needs replanning, or in areas where antimalaria activities are limited but where technical, economic and social problems are considerable, field research (together with feasibility studies) has a high priority.

Knowledge and understanding of the local transmission dynamics are needed for the selection and timely application of intervention measures, the more so when the available resources are scarce. Special skills are required to plan malaria control activities and to carry out field research activities aiming at the solution of local problems.

Although the teaching of field research techniques should be included in training programmes, time is needed to build up the experience required. As the required expertise is limited, it is necessary to mobilize the human resources available in the countries concerned (e.g. specialized personnel of universities and institutes of research) and to use them for a coordinated effort. International technical cooperation has a very important role to play in this endeavour.

Thus, it can be concluded that there is an urgent need to speed up training and research in practical malariology. If this is not done, malaria control programmes will continue to face the same problems for many years, and the situation may deteriorate even further in view of the new technical problems that may be expected.

The global antimalaria programme lays great emphasis on training. The objectives of that programme are:

- to upgrade the quality of national training programmes;
- to provide technical and administrative support for national training programmes in Asia, America and Africa;
- to provide for regional training courses to meet training needs beyond the scope of national centres.

It is stressed that training is a national responsibility, but it would be more economical and comprehensive if it were carried out in cooperation with neighbouring countries as well as with international and bilateral agencies.

The first step in the implementation of this global programme would be the creation of an international coordinating secretariat for malaria training in countries of the Asian continent, which includes countries from three WHO Regions, namely the Eastern Mediterranean, South-East Asia and Western Pacific. International support may consist of:

- additional resources for the support of national efforts, namely awarding fellowships, obtaining consultant services, coordinating the exchange of teachers, and providing teaching equipment and supplies;
- technical cooperation for the development of curricula for training courses, appropriate teaching methodology and teaching aids;
- coordination among national training programmes in order to avoid overlapping and repetition;
- training of malaria teachers;
- promoting applied field research.

A parallel effort should also be made in Africa and the Americas, where a similar approach could be envisaged. However, important resources are needed, not only financial but in terms of experienced personnel, and difficulties are encountered in securing them.

Training should not be regarded in isolation from the realities encountered in the field. For these reasons, close cooperation should be established between teachers and malaria workers. This will help to define realistic malaria control tasks, from which learning objectives can be moulded, and to select and implement professional learning activities for students to work in the field, and problem-solving exercises.

The review of recent history of malaria in the European Region showed that large areas of it are still moderately or highly receptive to the disease. Two WHO meetings[a] have recommended that:

- national services for malaria surveillance be strengthened;
- periodical and regular training courses for professional and allied personnel in the field of malaria, and specifically in malaria control methods, be stimulated, promoted and carried out;

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[a] Working Group on Receptivity to Malaria and Other Parasitic Diseases, Izmir, 11-15 September 1978 (ICP/MPD 004).

Coordination Meeting on the Prevention of the Reintroduction of Malaria in the Countries of the Western Mediterranean, Erice, 22-28 October 1979 (ICP/MPD 008).

- training in parasitology and tropical medicine be re-established and expanded at the faculties of medicine, biological science and other institutions for training of all categories of allied and auxiliary personnel.

These meetings recognized that the expertise required to deal with malaria surveillance and malaria reintroduction is scarce or not available and that there is an urgent need to promote training programmes, particularly in countries where malaria outbreaks may occur.

An inventory of the human resources available to meet training needs (in terms of categories, number of personnel and related disciplines) has been prepared.

4.2 Training resources available and required[a]

The European schools of medicine and tropical medicine and other similar institutes have a worldwide reputation, but the teaching of disciplines related to malaria control has been either reduced or discontinued. It is thus necessary to organize in some of these schools and institutes special courses in parasitology, malariology, entomology and control activities. These courses are needed not only for the training of personnel to meet the needs of the European Region, but also for the training of personnel from endemic countries. In this respect, the European community could help the developing world by providing fellowships for overseas trainees. Also, their specialized institutions could organize ad hoc courses for national as well as for foreign trainees. The theoretical training carried out in the malaria-free countries of Europe should be completed by practical training in countries where antimalaria activities are in progress or contemplated. Demonstration areas are essential for the trainees, as it is through these that practical malariology, including approaches for the selection and application of control methods, can be taught. Moreover, follow-up by the institutes receiving the trainees should be the rule, so that the newly trained personnel can be adequately guided in building up field experience. With this objective in mind, the temporary assignment of teachers from the European schools to endemic countries to participate in the field training should be favourably considered. This will progressively enable endemic countries to select the most rational methods of malaria control, taking into account effectiveness and costs, and European countries, on the other hand, to gain the needed field experience.

In the light of these needs and possibilities, it appears that the problem of training facilities could be examined from three angles. The first concerns the facilities offered by European countries for the training of operational staff specialized in malaria control. The second refers to training at medical schools in diagnosis, pathology, chemotherapy and chemoprophylaxis of malaria, as one aspect of the prevention of sequelae of imported malaria cases. The third is related to the means of providing sufficient training in malaria and tropical medicine for students from countries where the disease is endemic who are studying at schools in Europe.

4.3 Existing facilities

4.3.1 Training of operational staff specialized in malaria control

At present, there seems to be virtually no training in Europe for such staff. The M.Sc. course in community medicine in developing countries, offered by the London School of Hygiene and Tropical Medicine, may be the course nearest to meeting the requirements of training of operational staff.

4.3.2 Courses in diagnosis, pathology, chemotherapy and chemoprophylaxis of malaria

No courses are organized which deal exclusively with malaria, but all courses on tropical medicine have a malaria component. Such courses are available - usually annually - at the following member institutions of the Council (listed in alphabetical order of countries):

[a] This section of the report attempts to summarize all the information available on malaria with reference to training facilities at the European schools and institutes of tropical medicine and hygiene. The information is based on the Council's Review of activities (2nd ed., Basle, 1979) and on comments obtained from the Council's member institutions upon request (see Annex IV). It does not cover courses offered by institutions outside the Council - of which there are several - nor courses forming part of the curricula at faculties of medicine or sciences (e.g. in parasitology).

Belgium

Antwerp	Diploma in medicine (5 months; for physicians) Course in tropical medicine (5 months; for nurses) International course in health development (master's degree; 9 months; cf. Amsterdam and Leiden)

Czechoslovakia

Prague	Course in tropical medicine and hygiene (3 months) Course in tropical parasitology (2 weeks) Course in management of imported tropical diseases and in assessment of fitness for work in developing countries (2 weeks) Individual training in tropical medicine (1 month)

France

Marseille	Tropical medicine (3-1/2 months)
Marseille Pharo	Postgraduate courses in tropical medicine (4 months and 6 weeks)
Paris	Diploma in tropical medicine (1 year)

Germany, Federal Republic of

Hamburg	Postgraduate course in tropical medicine and medical parasitology (3 months) Short postgraduate course for physicians in tropical medicine and medical parasitology (8 weeks; cf. Heidelburg and Tübingen) Short course in tropical medicine for nurses and technicians (2 weeks)
Heidelberg	Medical care in developing countries (8 weeks; cf. Hamburg and Tübingen) Seminar on tropical medicine for South-Asian physicians and students within the programme of Friedrich Tieding-Stiftung, Verband Deutscher Aerzte (Hartmann-Bund)
Tübingen	Medical care in developing countries (8 weeks; cf. Hamburg and Heidelburg)

Hungary

Budapest	Specialized postgraduate courses and training in tropical medicine and hygiene

Netherlands

Amsterdam	National course in tropical medicine and hygiene (2 months) International course in health development (master's degree; 9 months; cf. Antwerp and Leiden)
Leiden	International course in health development (cf. Antwerp and Amsterdam) Postgraduate course in health development (2 days, every 3 years)

Poland

Poznan	Clinical parasitology (1 week) Imported exotic diseases (1 week)

Portugal

Lisbon	Clinical tropical medicine (short course) Hygiene and tropical medicine (9 months)

Romania

Bucharest	Courses in infectious diseases for medical graduates (in the sixth year of study) Postgraduate course in tropical diseases (3 weeks)

Sweden

Stockholm	Diploma in tropical medicine for physicians (2 months) Diploma in nutrition, public health and tropical medicine (3 months) Postgraduate course in tropical medicine (1 week)

Switzerland

Basle	Diploma in tropical medicine (3 months) Course for medical and biomedical technicians

United Kingdom

Liverpool	Diploma in tropical medicine and hygiene (3 months) Certificate in tropical community medicine and health (3 months) Diploma in tropical child health (8 months or, in certain cases, 6 months) M.Sc. in community health (1 year) M.Sc. in applied parasitology and medical entomology (1 year)
London	M.Sc. in community health in developing countries (1 year) M.Sc. in clinical tropical medicine (1 year) M.Sc. in medical parasitology (1 year)

Yugoslavia

Zagreb	Outlines of medical microbiology and parasitology Clinical microbiology and parasitology

4.3.3 Training in malaria and tropical medicine for students from countries where the disease is endemic who are studying at schools in Europe

As a rule, the courses listed above are open to foreign students, including those from countries where malaria is endemic. It is understood that, in some countries, attendance at such courses is compulsory. Mention is made here of the course in tropical diseases for foreign medical graduates (in the fourth and fifth years of study), organized by Infectious and Tropical Disease Clinic, V. Babes Hospital, Bucharest. In other countries, students are encouraged to take a course in tropical medicine once they have completed the normal curriculum; in some institutions, they are offered grants if they agree to take an additional course in tropical medicine.

4.4 Conclusions

(1) With regard to operational staff training, there do not appear to be any courses organized on a regular basis at present. Courses for individuals may be arranged upon request at several institutions and more could be organized. The introduction of regular courses, although feasible in several of the larger institutions, would need careful study with respect to actual needs, type of participant, goals of the training, curricula, teachers, teaching aids, facilities, duration of the training, financial aspects and, last but not least, international coordination.

(2) Training of physicians and other health staff is undertaken in the majority of European countries. It may be considered adequate at postgraduate level for physicians, at least for those who wish to exercise their profession in Europe or who wish to spend only a short time in countries

where malaria is endemic. It is considered insufficient at the undergraduate level, although admittedly it is improving. It is clearly unsatisfactory with respect to auxiliary health staff, who play an important role in detection and diagnosis.

In the present circumstances, it might be advisable to redefine the role of institutions such as schools and institutes of tropical medicine and hygiene as opposed to the role of medical faculties. Should the faculties decide to fully integrate instruction on malaria (and other imported diseases) into the undergraduate curricula, the schools and institutes might concentrate on courses at the higher, i.e. true specialist's, level.

As to auxiliary health staff who will work in Europe, it is felt that their schools should be able to rely on the collaboration of the existing schools and institutes of tropical medicine and hygiene for some time to come. Whether such staff who are due to work in countries with endemic malaria ought to be trained in Europe is open to question since (1) developing countries show a growing tendency to employ people of local origin and (2) foreign trainees easily become alienated while undergoing their training in Europe.

As to scientists (parasitologists, entomologists, epidemiologists, etc.), it is felt that they have adequate opportunities to acquire a good grounding at various institutions in Europe. What may be missing is the link between university studies and applied work in the field.

(3) Students from countries where malaria is endemic, who undergo their training (medical or scientific) in Europe, are able to acquire the additional knowledge needed to exercise their profession in their countries of origin. The requirements for such special training depend, to some extent, on the legislation of the respective countries of origin: in many, it is required by law in order to fill a specific function (i.e. malariologist); in some, it is considered desirable, but not compulsory; while in others it may be encouraged if the possibility is offered in the receiving country.

5. Mechanisms for the involvement of European countries in WHO's malaria action programme

5.1 Scope and aims of the malaria action programme: its needs

The malaria action programme can be viewed as a three-dimensional system consisting of planning, research and health manpower development. These three elements are interlinked, and simultaneous activities are required in all three. In fact, most of the personnel trained in malariology in the past have been lost due to absence of properly planned antimalaria campaigns, including provision for the development of careers, and many malaria eradication programmes have collapsed, not only because of lack of resources but also because of technical difficulties which could not be overcome in the absence of well oriented applied field research.

Steps are being taken to develop the malaria action programme in these different directions. Planning methodology is being developed, a new approach for stimulating national training is being planned in cooperation with USAID, and applied field research is being promoted through the mechanism of the special programme for research and training in tropical diseases.

No single agency can find a solution to the complex problem of malaria in the world. Therefore, more active cooperation is required between the countries and the bilateral and international agencies. European countries can especially contribute in the fields of research and training. While research in basic sciences such as parasitology, entomology, immunology and pharmacology of malaria have received traditionally great attention in European institutions, applied field research has been neglected, and therefore particular effort should be made in this direction.

It should be remembered that malaria, though no longer prevalent in Europe, has not ceased to be of interest and concern to countries of the European Region if the various implications for productivity in the developing world, and trade with it, as well as tourism are all taken into account. Furthermore, the reintroduction of parasites in areas long cleared of the disease, by infected travellers, is always a threat requiring costly control measures in territories where anophelines are still prevalent.

Participation in the malaria action programme is, thus, not only a moral duty for the European community of countries, but also carries with it a certain degree of self-interest which should not be discounted lightly.

The technical cooperation of European countries in the field of applied research on malaria may assume many forms. Scientific institutes could collaborate with endemic countries in the formulation and implementation of field research studies. Technical expertise could be made available for this endeavour, and the opportunity should be taken to broaden the scope of the training aspect already mentioned. The exchange of scientific workers between specialized institutes and endemic countries should become a routine for the mutual benefit of the two parties concerned.

Applied field research projects in malaria can be developed only if human and financial resources are available. While much has been said on how expertise could be made available, it remains to be mentioned that, without considerable financial assistance, the programme on applied field research cannot make substantial progress. The efforts should be commensurate with the needs. These are great, as there are practically no areas in the world where applied field research activities are not required.

It has been repeatedly stressed that extrabudgetary resources should be made available by international and bilateral agencies for the correct implementation of the malaria action programme. Under the present circumstances, it is difficult to quantify exactly the programme needs, as many countries have not yet joined the programme, although they are expected to do so in the immediate future, and others have not yet been able to redefine the programme's objectives. It is estimated that, for 1981, a contribution of 6 million dollars will cover the needs for programme replanning, training and research. About 75% of these resources should be spent on the reorientation of control programmes, planning and training and 25% for the strengthening of an applied field research programme in malaria. Some 4.5 million dollars should be utilized for:

- the recruitment of consultants (evaluation of programmes, assistance in planning, conduct of seminars or working groups, etc.);
- the support for the WHO regional comprehensive training programme in Asia and elsewhere;
- the organization of training courses in at least two European countries;
- the establishment of demonstration areas in at least two endemic countries to complete the theoretical training carried out in European schools;
- the financing of fellowships and exchange of scientific workers.

About 1.5 million dollars should be invested in the development of applied field research projects in addition to the resources already made available. The resources needed for direct assistance to programmes, such as drugs and insecticides, have not been included in this amount.

5.2 Some possible mechanisms for involvement of countries of the European and other Regions

European solidarity could, depending on the choice and degree of commitment of the participating countries, take different forms. Some of the possible approaches are given below.

Strengthening of the malaria action programme. This would require, in particular, a commitment by countries of the European Region to increase their contributions to the WHO global programme through the existing extrabudgetary mechanisms of the Organization. Of primary importance would be the assurance that such support would be maintained or increased over a number of years, so as to ensure that any momentum gained would not subsequently be lost, as has often happened with major operations of this kind in the past. Unfortunately, the policies governing foreign aid in a number of European countries make such an approach difficult as the relevant commitments have to be submitted, in most cases, for parliamentary approval; this is often a complicated and protracted procedure.

Creation of a malaria coordination mechanism, so as to ensure that at least the technical and financial support already provided through bilateral and multilateral channels, and by the authorities of the receiving countries, are indeed used in a coherent and coordinated form, being put to the best avail. WHO is, traditionally and constitutionally, the focus for such action, but additional resources are certainly required to increase both promotional efforts and field operations. It is to be noted that a concerted, common policy approach by the European delegations in the governing bodies of international development assistance organizations, such as UNDP, FAO, UNICEF, and in financial bodies, such as the World Bank, regional development banks, European Economic Community, etc., could greatly contribute to enhancing material support for the malaria action programme.

Establishment of a special fund, to support the malaria action programme, along the lines already successfully developed for such special WHO programmes as the special programme for research and training in tropical diseases, the human reproduction research programme and the

onchocerciasis control programme in central and west Africa. This approach, based on the creation of a consultative board in which both donor and recipient countries are represented and of an appropriate steering mechanism, offers the advantage of providing the funding agencies with better justification for their contributions, with a close monitoring of the programme and with detailed reports on technical and administrative aspects.

5.3 Future action

These tentative suggestions, based on some of WHO's past experience with the funding of major health operational programmes, are offered as possible pointers for further action by WHO. These suggestions are in no way limiting or exclusive.

6. Conclusions

In the planning of future control strategy, it was felt that particular attention should be given to:

- the development of the malaria situation in the world and the need for increased efforts in order to maintain sufficient control, including intensified research on training facilities;
- the threatening situation for countries where malaria has been eradicated or reduced to a low level, associated with insufficient awareness of the authorities and the public;
- the need for increased and sustained support by countries with resources of funds, supplies, equipment, and scientific and technical skill for less favoured countries;
- the mutual need of technical and scientific cooperation between malarious countries and countries where no malaria transmission occurs but where highly developed scientific institutions for malaria and tropical diseases are found.

7. Recommendations

WHO - international level

(1) A commitment should be sought from countries and international agencies in a position to support the WHO malaria action programme to increase their assistance for this purpose through WHO's existing budgetary mechanisms on a long-term basis.

(2) An international mechanism should be established for the coordination of financial and technical assistance to the malaria action programme when provided by intergovernmental and bilateral agencies in conjunction with national programmes in need of external aid.

(3) A special fund should be established in support of the malaria action programme, comprising consultative and/or steering mechanisms in which both contributing and recipient countries will be represented to ensure ongoing funding and monitoring of the programme.

(4) Further steps should be taken to obtain from the European and other countries as well as from international agencies (such as UNDP, World Bank, EEC and USAID) commitments to provide additional support in terms of funds, staff, technical and scientific contributions, supplies and equipment to assist in malaria control, eradication and surveillance wherever necessary.

(5) A greater and continued effort should be made in information and motivation to bring to the attention of national governments, international agencies, private foundations and other authorities the possible human, social and economic consequences which can derive from the reintroduction of malaria into the countries which have eradicated the disease or curbed it to a low level.

(6) The research and training institutions in endemic malarious countries should be informed about the readiness of scientists in the European Region to cooperate fully in relevant research and training programmes.

(7) Member States should be encouraged to maintain fully the training and research activity of institutes of tropical medicine and public hygiene and other relevant institutions, thus enabling the countries to increase their cooperation for malaria control in the world.

(8) Governments should be requested to intensify the teaching of medical parasitology to medical students in relevant schools, and a number of questions related to tropical diseases should be incorporated in the set of examination questions.

(9) WHO should promote training in malaria serology, provide detailed information to Member States on the present status of technological development in the field of immunodiagnostic procedures in malaria, and ensure as far as possible the provision of standard antigens for immunodiagnostic fluorescent tests to those Member States that may not have the possibility of maintaining permanent sources of these substances.

(10) WHO should continue to provide full and up-to-date information on the spread of P. falciparum resistance and on the drugs and dosage schedules most appropriate for dealing with such cases.

(11) The problem of shortage of primaquine should be studied and appropriate action to remedy the situation be taken.

(12) WHO should support or carry out field studies on the use of 8-aminoquinolines for radical treatment of P. vivax malaria, especially in areas where its importation may lead to the resurgence of endemicity.

(13) Governments and some important private foundations or trusts should be encouraged to offer fellowships and stipends to selected candidates from developing countries of the world for study at universities and institutes of tropical medicine in the European Region.

(14) The WHO programme on appropriate technology for health should support the development of malaria control equipment, which is simple to use, sturdy and can be produced or purchased at low cost.

(15) WHO should take action, in cooperation with FAO and UNEP, to improve appropriate training in all relevant aspects of human and environmental safety.

WHO/malaria-infected countries (European Region)

(16) Support should be given for joint activities to increase training and research established between institutions in malarious countries and countries without transmission.

(17) International training courses should be organized in an institute in Italy, with the added possibility of practical field training in a demonstration area in Turkey.

(18) There is a need to organize and develop the research demonstration and training area for malaria, as offered by Turkey, which can be used by that and neighbouring countries to develop malaria control strategies based on the concept of primary health care, for areas with a long transmission season, irrigated crops and vector multi-resistance to pesticides. WHO, in close liaison with the European and other countries concerned, should investigate ways and means to speed up the development of this facility, which could serve south European, Middle East and north African countries. The facility may also be considered for the field training of specialists having attended formal courses on malaria control in European schools of tropical medicine and hygiene.

(19) Similar demonstration areas should be established in other malarious countries to cover a broad range of epidemiological and socioeconomic conditions to provide practical field training for specialists having attended courses in schools of tropical medicine and hygiene.

(20) Appropriate steps should be taken to improve the distribution of information on development of vector resistance and safe use of insecticides, so as to ensure better cooperation of the public works and the agricultural sector with malaria control campaigns.

(21) Undergraduates from tropical developing countries, who receive their medical degrees in one of the European medical schools, and physicians intending to work in the tropics should be encouraged to attend a course at one of the institutions capable of providing such training.

(22) A facility should be established for characterizing isolates of P. falciparum and other species from a wide selection of malarious areas.

Countries where malaria is not endemic but which are at risk (European and other Regions)

(23) It is recommended that the countries maintain and, if necessary, increase their expertise in the field of malaria in order to adjust their vigilance activities to the degree of malaria risk, and that they strengthen their technical cooperation with countries where malaria is still a problem (the latter involvement could take the form of consortium-type arrangements whereby specialists, equipment and supplies as well as fellowships would be provided free of charge or on a shared basis to institutions in the developing world).

(24) An inventory of human and training resources available for countries where malaria is endemic should be prepared in each country.

(25) There is a need to ensure that the notification of all cases of malaria - whether indigenous, introduced or induced - is carried out by all health authorities.

(26) A national malaria reference centre should be established in each country.

(27) Necessary and pertinent information about malaria risk should be provided to all travel agencies and travellers.

(28) There is a need to foster the consciousness of the eventuality of malaria outbreaks, thereby ensuring that the countries have the necessary human and technical resources for rapid deployment, and to prepare a plan for concerted action such as the early release of funds, lifting of relevant customs barriers and lifting of restrictions on purchase of equipment and material not available locally.

(29) The receptivity of various important species of Anopheles to human plasmodia of tropical origin should be investigated fully and speedily.

Countries where malaria is endemic (European Region)

(30) Arrangements should be made for technical personnel in the countries to gain more experience in malaria control and to undertake relevant training in countries of the European Region, through the establishment of fellowships and posts in specialized institutions or by temporary employment of teaching staff from the Region.

(31) While fundamental studies on the biology, physiology and genetics of malaria vectors are considered essential for the development of improved methods of vector control, each venture in such fields should be evaluated in terms of its relevance to malaria control, and field studies should be related, from their inception, to the solution of practical problems of malaria control.

(32) An approach to malaria eradication or control should be formulated in accordance with the following conditions indicated by the WHO Director-General in his report on malaria control strategy submitted to the Thirty-first World Health Assembly, i.e.:

(a) to express the national will through a political decision;

(b) to ensure long-term support to antimalaria activities;

(c) to accept the antimalaria programme as an integral part of the national health programme; and

(d) to promote community participation.

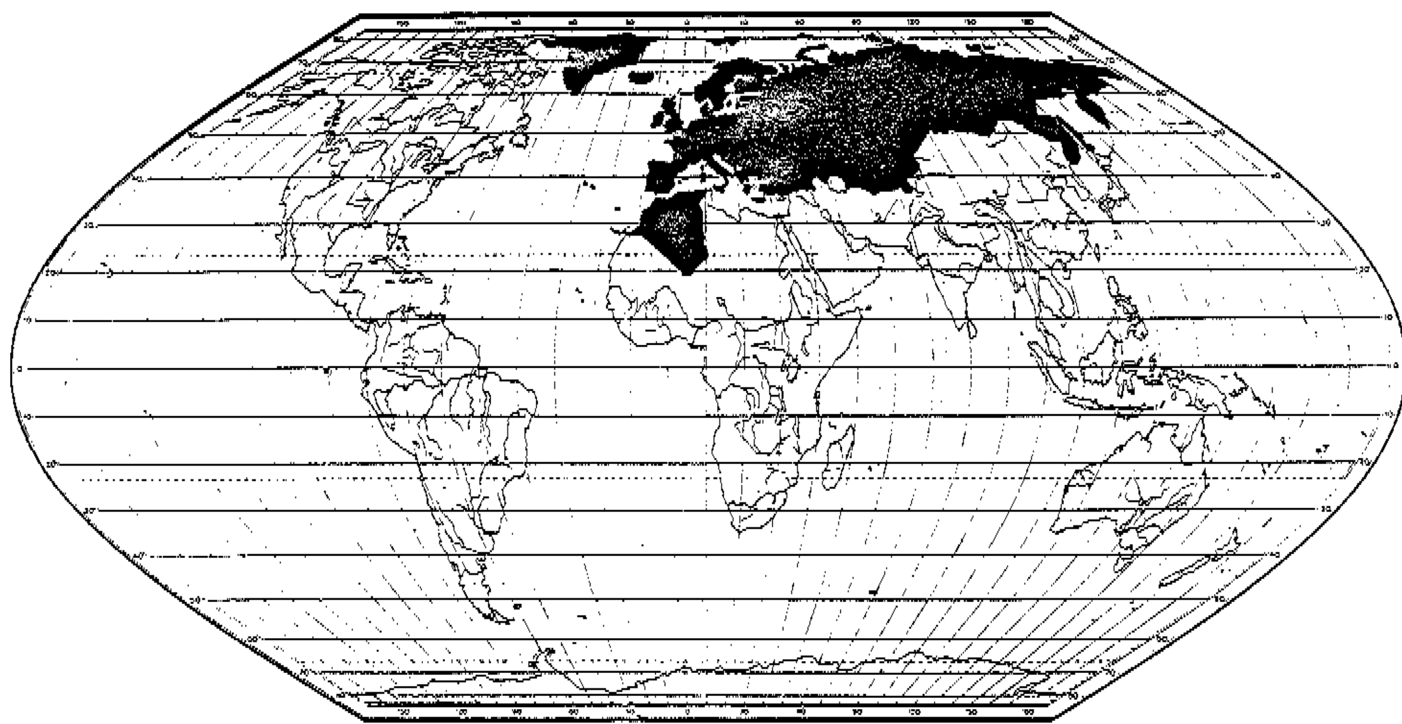
General

(33) Developing countries in the tropics should speed up the establishment of budgetary posts, career structures and training facilities for relevant personnel in cooperation with WHO.

(34) The Italian authorities (together with WHO and possibly the Rockefeller Foundation) should consider the feasibility of undertaking a multidisciplinary study of the socioeconomic and environmental effects of the early eradication of malaria from Sardinia.

Annex I

THE EUROPEAN REGION OF WHO



Annex II

EUROPEAN REGION OF WHO - ESTIMATED POPULATION 1977 (MEAN OR MID-YEAR)
(in thousands)

Country	Population
Albania	2 514[a]
Algeria	17 910
Austria	7 518
Belgium	9 830
Bulgaria	8 804
Czechoslovakia	15 031[b]
Denmark	5 088
Finland	4 739[b]
France	53 094
German Democratic Republic	16 765
Germany, Federal Republic of	61 396
Greece	9 268
Hungary	10 648
Iceland	222
Ireland	3 192[b]
Italy	56 461
Luxembourg	356
Malta	332
Monaco	25[b]
Morocco	18 247
Netherlands	13 856
Norway	4 043
Poland	34 698
Portugal	9 733
Romania	21 658
San Marino	20
Spain	36 672
Sweden	8 252
Switzerland	6 327
Turkey	42 134[a]
USSR	258 932
United Kingdom	55 853
Yugoslavia	21 775
Total	815 393

[a] Unofficial data or estimate

[b] Preliminary, approximate or estimated data

Source: World health statistics annual, Geneva, 1980

Annex III

OFFICIAL REGISTER OF AREAS WHERE MALARIA ERADICATION HAS BEEN ACHIEVED

Country	Population in originally malarious areas at date of registration	Date of registration
Hungary	1 421 000	March 1964
Spain	22 500 000	September 1964
Bulgaria	1 806 000	July 1965
Poland	112 000	October 1967
Romania	7 500 000	October 1967
Italy	4 335 000	November 1970
Netherlands	2 097 000	November 1970
Portugal (excluding the islands)	2 490 000	November 1973
Yugoslavia	6 493 000	November 1973

SUPPLEMENTARY LIST OF MALARIA-FREE AREAS[a]

Country	Date of notification
Belgium	February 1963
Denmark	February 1963
Finland	February 1963
Iceland	February 1963
Ireland	February 1963
Malta	February 1963
Monaco	February 1963
Norway	February 1963
San Marino	February 1963
Sweden	February 1963
Switzerland	February 1963
United Kingdom	February 1963
Czechoslovakia	April 1963
Austria	October 1963
Germany, Federal Republic of	November 1963

[a] Malaria eradicated before 1953

Source: Weekly epidemiological record, 1973, 48(34); 1975, 50(6,7)

Annex IV

MALARIA TRAINING IN THE EUROPEAN REGION

Belgium	Institut de Médecine tropicale "Prince Léopold" Nationalestraat 155 B-2000 Antwerp
Czechoslovakia	Chair of Tropical and Subtropical Diseases Postgraduate School of Medicine Ruska 85 CS-100 05 Prague 10
Denmark	Institute of Infectious Diseases University of Odense Campusvej DK-5230 Odense
France	Université d'Aix-Marseille II Unité de Recherche de Médecine et de Santé tropicales Hôpital Félix Houphouet-Boigny 416 chemin de la Madrague-Ville F-13015 Marseille
	Institut de Médecine tropicale du Service de Santé des Armées (Etablissement militaire : Ecole du Pharo) Parc du Pharo F-13998 Marseille
	Institut de Médecine de d'Epidémiologie africaines (Fondation Léon MBA) Hôpital Claude Bernard 10 av. Porte d'Aubervilliers F-75019 Paris
Germany, Federal Republic of	Bernhard-Nocht Institut für Schiffs- und Tropenkrankheiten Bernhard-Nocht-Strasse 74 D-2000 Hamburg 4
	Institut für Tropenhygiene und öffentliches Gesundheitswesen am Südasieninstitut der Universität Heidelberg Im Neuenheimer Feld 324 D-6900 Heidelberg 1
	Tropenmedizinisches Institut der Universität Tübingen Wilhelmstrasse 11 D-7400 Tübingen
Hungary	Hungarian Tropical Health Institute Postgraduate Medical School Szabolcs 35 H-1389 Budapest
Netherlands	Koninklijk Instituut voor de Tropen Mauritskade 63 NL-Amsterdam-Oost
	Instituut voor Tropische Geneeskunde Universiteit van Leiden Rapenburg 33 NL-2311 GG Leiden

Poland	Academy of Medicine Clinic of Parasitic and Tropical Diseases Przybzszewskiego 49 PL-60-355 Poznan
Portugal	Institute of Hygiene and Tropical Medicine Rua da Junqueira 96 P-1300 Lisbon
Romania	Infectious and Tropical Diseases Clinic V. Babes Hospital Sos. Mihai Bravu 281 Bucharest - Sect. 4
Sweden	Karolinska Institute for Infectious Diseases Roslagstulls Sjukhus S-114 89 Stockholm
Switzerland	Schweizerisches Tropeninstitut Socinstrasse 57 CH-4051 Basle
USSR	Martsinovski Institute of Medical Parasitology and Tropical Medicine Ministry of Health of the USSR M. Pirogovskaya 20 Moscow 119435
Yugoslavia	Andrija Štampar School of Public Health Medical Faculty University of Zagreb Rockefeller 4 Y-41000 Zagreb
United Kingdom	Liverpool School of Tropical Medicine Pembroke Place UK-Liverpool L3 5QA
	London School of Hygiene and Tropical Medicine Keppel Street UK-London WC1E 7HT

Annex V

LIST OF WORKING PAPERS AND BACKGROUND MATERIAL

Working papers

ICP/MPD 009/6	Present situation of malaria in the world and possible approaches for its control - Dr T. Lepes
ICP/MPD 009/7	Malaria situation in the European Region of WHO: achievements, present status and future prospects - Dr M. Postiglione
ICP/MPD 009/8	Training facilities with regard to malaria existing at European schools and institutes of tropical medicine and hygiene - Professor T.A. Freyvogel
ICP/MPD 009/9	Mechanisms for the involvement of European countries in the global malaria action programme - Dr A. Mochi and Dr F.L. Oddo

Background material

ICP/MPD 004	Receptivity to malaria and other parasitic diseases: report on a WHO Working Group, Izmir, 11-15 September 1978
ICP/MPD 008	Coordination de la lutte contre la réintroduction du paludisme dans les pays de la Méditerranée occidentale: rapport sur la réunion d'un groupe de travail, Erice (Italie), 23-27 octobre 1979 (French only)
ICP/MPD 007	Meeting on the coordination of antimalaria activities in south-east Europe: report on a WHO meeting, Sofia, 3-6 March 1980
A31/19	Malaria control strategy: report by the WHO Director-General, Thirty-first World Health Assembly, 15 March 1978
Resolution WHA31.45	Malaria control strategy. Thirty-first World Health Assembly, 24 May 1978
Resolution WHA32.35	Development of the malaria action programme in Africa. Thirty-second World Health Assembly, 25 May 1979
A33/13	Malaria control strategy: progress report by the WHO Director-General, Thirty-third World Health Assembly, 17 April 1980
MAP 80.1 VBC 80.2	Summary of scientific progress in the field of malaria published during the last five years: information paper prepared jointly by the Malaria Action Programme and Division of Vector Biology and Control, WHO, Geneva, 1980
7 AMC/WP/80.12	The role of the malaria action programme in the implementation of malaria control programmes: document prepared by the Director, Malaria Action Programme, WHO, Geneva, for the Seventh Asian Malaria Conference, Manila, 3-7 November 1980
	Training and field applied research: document prepared by Dr S. Goriup, Medical Officer, Epidemiological Methodology and Evaluation, Malaria Action Programme, WHO, Geneva, 1980

Annex VI

THIRTY-FIRST WORLD HEALTH ASSEMBLY

WHA31.45

24 May 1978

MALARIA CONTROL STRATEGY

The Thirty-first World Health Assembly,

Having considered the Director-General's report on malaria control strategy;[1]

Recognizing that the critical situation in malaria in many countries spread over all regions of the world is jeopardizing not only the health of their populations but also their overall socioeconomic development;

Considering that there are areas where man has caused the spread of malaria through the building of barrages, dams and artificial lakes;

Aware that such trend of deterioration if not checked immediately would result in a problem of global dimensions and that it could often be reversed with determination and political will of Member countries and by the flexible selection and judicious utilization of malaria control methods that are already available;

Considering with regret that most of the recommendations in resolution WHA22.39 adopted by the Twenty-second World Health Assembly, when it re-examined the global strategy for malaria eradication, and in subsequent resolutions of the Executive Board and Health Assembly, have not been adequately implemented;

Subscribing with satisfaction to the decision of the Executive Board to re-establish an ad hoc Committee on Malaria;

1. ENDORSES the report of the Director-General;

2. EMPHASIZES that it will not be possible to stop the dramatic recrudescence of malaria unless firm national commitments are made to combat it and adequate resources are devoted to antimalaria activities, nationally and internationally;

3. URGES Member States to reorient their antimalaria programmes - with the final objective of malaria eradication where possible - as an integral part of their national health programme in accordance with the guidelines set out in the Director-General's report and to increase their commitments (fiscal, administrative and technical) against malaria within their national development plans;

4. REQUESTS the Director-General:

(1) to stimulate and strengthen technical cooperation between the Organization and its Member States and among countries themselves in the rapid development and effective implementation of their antimalaria programmes;

(2) to promote intercountry and interregional coordination of the national antimalaria control programmes;

[1] Document A31/19.

(3) to provide technical guidance and support to malaria control activities; and to study ways and means of securing for Member States reliable sources of cheap and least toxic pesticides and antimalaria drugs;

(4) to increase the Organization's participation in the comprehensive and multipurpose training of public health workers in the malaria field;

(5) to expand and support the antimalaria basic and applied field research programme with a view to improving antimalaria methodology;

(6) to identify, stimulate, promote and coordinate international and bilateral financial involvement and technical cooperation in the field of malaria;

(7) to give a higher priority to the malaria control programme in the proposed programme budget for 1980-81 whether in the regular budget or through the mobilization of extrabudgetary resources, so that the necessary national efforts can be adequately supported;

(8) to take the appropriate steps in order to achieve an active coordination of malaria control activities with the activities of the Special Programme of Research and Training in Tropical Diseases, thus ensuring the quickest implementation of any new technology;

(9) to review the functional structures of the Organization dealing with malaria so as to gear itself to undertake a comprehensive, purposeful and effective drive with the goal of speedy control of the disease;

(10) to report to the Executive Board and to the Thirty-third World Health Assembly on the evolution of the malaria situation and on the implementation of the malaria control strategy by Member States and by the Organization.

Thirteenth plenary meeting, 24 May 1978
A31/VR/13

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Annex VII

THIRTY-SECOND WORLD HEALTH ASSEMBLY — WHA32.35

25 May 1979

DEVELOPMENT OF THE MALARIA ACTION PROGRAMME IN AFRICA

The Thirty-second World Health Assembly,

Noting with grave concern that, in spite of the recommendations of resolution WHA31.45 adopted by the Thirty-first World Health Assembly and numerous previous resolutions on the subject, organized antimalaria activities are yet to be initiated by most countries in the African Region where the havoc caused by the disease is greatest;

Realizing that many African countries are faced with complex financial, administrative, technical and operational problems in connexion with the planning, implementation and evaluation of realistic and flexible antimalaria activities in accordance with the new tactical variants developed by the Organization;

Realizing further that, unless the African countries are assisted to implement realistic antimalaria activities, the situation will further deteriorate and consequently jeopardize the achievement of the goal of health for all by the year 2000;

1. URGES Member States

(1) to establish technical cooperation for the urgent development of realistic antimalaria activities in the spirit of resolutions WHA31.41 and EB63.R31 on technical cooperation among developing countries and based on technical guidelines developed by the World Health Organization's Malaria Action Programme;

(2) to intensify coordination with WHO and other international, bilateral and voluntary agencies in the mobilization of the necessary resources in support of antimalaria activities, including the production of antimalaria drugs and insecticides in countries in need of such supplies;

(3) to intensify cooperation and collaboration with WHO and other cooperating agencies as appropriate;

2. REQUESTS the Director-General

(1) to establish a special task force for the cooperation and collaboration with Member States in Africa in the development of organized antimalaria activities;

(2) to strengthen further WHO's functional structure, particularly at the regional level, so as to gear the Organization to undertake the maximum possible comprehensive, purposeful and effective action, with the goal of speedy combat of the disease;

(3) to give even higher priority to the malaria control programme in future Programme Budgets;

(4) to intensify active coordination of malaria control activities with those of the Special Programme for Research and Training in Tropical Diseases and other research projects in order to ensure the quickest possible implementation of any new technology;

(5) to explore every possibility of securing additional extrabudgetary funds for the Malaria Action Programme, and

(6) to report to the Executive Board and the World Health Assembly on the progress made.

Fourteenth plenary meeting, 25 May 1979
A32/VR/14

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Annex VIII

LIST OF PARTICIPANTS

ALGERIA

Dr R. Gassabi
Chief Medical Officer, Central Bureau for Malaria Eradication, National Institute of Public Health, El Madania - Algiers

AUSTRIA

Professor G. Wiedermann
Chairman of the Institute for Specific Prophylaxis and Tropical Medicine, University of Vienna

BELGIUM

Mr M. Coosemans
Prince Leopold Institute of Tropical Medicine, Antwerp

Dr M. Wery
Professor of Medical Protozoology, Prince Leopold Institute of Tropical Medicine, Antwerp

FRANCE

Professor M. Quilici
Timone Hospital Centre, Laboratory of Parasitology, Marseille University of Medicine (Vice-Chairman)

GERMAN DEMOCRATIC REPUBLIC

Dr G. Ockert
Institute of Hygiene, Berlin

HUNGARY

Professor F. Varnai
Director of the Hungarian Tropical Health Institute, Budapest (Vice-Chairman)

ITALY

Professor S. Bettini
Director of Research, Laboratory of Parasitology, Higher Institute of Health, Rome

Professor B. Biocca
Director, Institute of Parasitology, University of Rome (Chairman)

Professor I. Ilardi
Department of Cooperation and Development, Ministry of Foreign Affairs, Rome

MOROCCO

Professor N. Benmansour
Director, National Institute of Hygiene, Aguedal, Rabat

Mr M. Laaziri
Office of Research and Evaluation Operations, Ministry of Public Health, Rabat

PORTUGAL

Dr L. Amarchande
Director, Rural Health and Malaria Control Service, Lisbon

SPAIN

Dr L. Cañada Royo
Deputy Director-General for Preventive Medicine, Ministry of Health and Social Security, Madrid

SWEDEN

Dr E. Bengtsson
Professor, Karolinska Institute, and Head Physician, Roslagstull Hospital, Stockholm

SWITZERLAND

Professor T.A. Freyvogel
Director, Swiss Tropical Institute, Basle

TURKEY

Dr N. Tekirli
Chief Deputy Director-General, National Malaria Eradication Service, Ministry of Health and Social Assistance, Ankara

Dr U. Unsal
Director-General, National Malaria Eradication Service, Ministry of Health and Social Assistance, Ankara

UNITED KINGDOM

Professor W.H.R. Lumsden
Department of Health and Social Security, London

YUGOSLAVIA

Dr S. Litvinjenko
Chief, Infectious Diseases Section, Federal Institute of Public Health, Belgrade

Dr S. Ristic
Senior Inspector, Federal Committee for Labour, Health and Social Welfare, Novi Beograd

REPRESENTATIVES OF OTHER ORGANIZATIONS

Council of European Schools and Institutes of Tropical Medicine and Hygiene

Professor J.-P. Coulaud
Director, Institute of Tropical Medicine, Hôpital Claude Bernard, Paris, France

OBSERVERS

Dr A.T. Bonapace
District Medical Officer, Osidda (Nuoro), Sardinia

Dr C. Contini
Ministry of Health, Rome, Italy

Dr C. Monzali
Department of Public Hygiene, Ministry of Health, Rome, Italy

Professor L. Reale
Chairman, Italian Institute of Medicine, Rome, Italy

TEMPORARY ADVISERS

Professor L.J. Bruce-Chwatt
Wellcome Museum of Medical Science, London, United Kingdom (Rapporteur)

Professor M. Coluzzi
Institute of Parasitology, University of Rome, Italy

Professor L. Dardanoni
Director, Institute of Hygiene, University of Palermo, Italy

Professor G. Davidson
Director, Department of Entomology, London School of Hygiene and Tropical Medicine, United Kingdom

Dr A. Mochi
(formerly Chief, Cooperative Programme for Development, WHO, Geneva), Rome, Italy

Dr F.L. Oddo
Ministry of Health, Rome, Italy

Dr M. Service
Reader in Medical Entomology, Liverpool School of Tropical Medicine, United Kingdom

WORLD HEALTH ORGANIZATION

Regional Office for Europe

Dr Leo A. Kaprio
Regional Director

Dr K. Lassen
Regional Officer for Malaria (Secretary)

Dr M. Postiglione
Director, Disease Prevention and Control

Headquarters

Dr J. Hamon
Director, Vector Biology and Control

Dr T. Lepes
Director, Malaria Action Programme

Dr E. Onori
Malaria Action Programme

Regional Office for the Eastern Mediterranean

Dr L.F. Delfini
Regional Adviser for Malaria

Regional Office for the Western Pacific

Dr Y.H. Paik
Coordinator of Research Promotion and Development