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STATUS OF THE ANTIMALARIA PROGRAMME

Report by the Regional Director

SUMMARY

Considerable achievements have been made in the antimalaria programme during the past few decades but a stage without marked progress appears now to have been reached and, in one or two areas, some deterioration in the position has even been observed. Particularly in the remote rural areas of some countries malaria will continue to be a major health problem unless measures are taken to overcome major impediments to improving the situation.

Means of implementing those measures include:

- (1) overall support for the programme, including cooperation from international and bilateral sources, to provide the necessary administrative, financial and logistical bases for the implementation of field operations;
- (2) accelerated development of the rural health infrastructure so that it may become involved in the antimalaria programme; interdepartmental coordination between all agencies engaged in rural development;
- (3) promotion of a flexible approach to malaria control including studies on alternative control measures under different local conditions, where conventional methods have failed, and on the incorporation of antimalaria measures into primary health care activities;
- (4) strengthening of malaria manpower at intermediate and higher echelons;
- (5) applied field research into the major technical problems faced in the Region, i.e. the elusive behaviour of A. balabacensis and A. farauti, and drug-resistant malaria.

## 1. ORIGINALLY NON-MALARIOUS AREAS

It is an historical fact that 16 of the 32 countries or areas of the Region have never been malarious because of the absence of anopheline vectors. They are included in the WHO supplementary list of malaria-free areas and comprise New Zealand, the island groups commonly known as Micronesia and Polynesia, the southern and eastern Melanesian islands and a few isolated islands in the Indian Ocean, with a total population of about 6 million.

Whereas, for some of those islands, environmental conditions are such as to render the establishment of malaria vectors difficult and subsequent transmission of malaria practically impossible, the growing number of anopheline species identified during recent years in Guam may indicate that, in at least part of the non-malarious Pacific area, the introduction and establishment of a malaria vector population is more than a theoretical possibility. The so far limited invasion into Micronesia must be considered in the same light as the presence of A. farauti in New Hebrides, that is as evidence that in all likelihood nothing has prevented anophelines from invading the southern Pacific in the past except poor means of communication.

Increasing travel to and from malarious areas makes it important to prevent the introduction of malaria vectors by taking the necessary control measures at international ports and airports, including the disinsection of aircraft on international flights. Members of the local medical profession must also be kept up-to-date in the diagnosis, prophylaxis and treatment of malaria so that they can deal adequately with imported cases among visitors or returning residents, and give proper advice to out-going residents. It is of interest to note that in some European countries the malaria case fatality rate for imported cases is at present over 10%, due to unfortunate delays in diagnosis and thus in starting appropriate treatment. That malaria should remain as a subject on the curricula of medical schools and allied training institutions is of similar importance. WHO regularly provides relevant information on the world malaria situation for international travellers in the Weekly Epidemiological Record.

## 2. COUNTRIES OR AREAS IN THE MAINTENANCE PHASE

Of the 16 countries or areas of the Region originally wholly or partially malarious, endemic malaria has been eliminated from Australia, Brunei, Hong Kong, Japan, Macao and Singapore, with an estimated 13 million people now living in the originally malarious districts.

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<sup>1</sup>WHO Weekly Epidemiological Record, 1973, 48, No. 34, page 335.

The receptivity to malaria, i.e. the potential degree of transmission, is low in many parts of those six countries or areas. In some vulnerable regions where malaria might be imported by parasite carriers from abroad, receptivity has been kept low by the introduction of antimosquito measures on a more or less permanent basis. There are, however, quite a number of regions in the malaria maintenance phase where receptivity has remained moderately high and the influx of parasite carriers is relatively heavy.

The fact that no serious difficulties have been experienced so far in maintaining the malaria-free status, despite high malaria receptivity and/or vulnerability to imported cases, must be ascribed to the quality of malaria vigilance organizations established in the more receptive parts of each country or area. In general, however, notification of suspected cases remains only marginally satisfactory. WHO has been cooperating, and will be happy to continue to cooperate, in strengthening those organizations by providing technical guidance and orientation. Staff of the general health services in Australia, Hong Kong, Japan and Singapore have been regular participants in regional courses on malaria organized in Kuala Lumpur and Manila. Cooperation between countries has been stimulated by arranging that representatives of neighbouring countries, such as Indonesia, Malaysia and Singapore on the one hand, and those in the South-West Pacific area, on the other, should meet and discuss together ways and means of reducing vulnerability to imported malaria.

The promotion of malaria awareness in members of the health professions assumes an additional dimension in that it serves to prevent the re-establishment of the disease in areas from which it has been eradicated. This requires a liberal interpretation of symptoms to ensure that suspected cases of malaria are identified and are reported promptly by private and public health institutions.

### 3. MALARIOUS COUNTRIES OR AREAS

Endemic malaria still occurs in the remaining 10 originally malarious countries or areas of the Region, including the People's Republic of China, Democratic Kampuchea, Lao People's Democratic Republic, Malaysia, New Hebrides, Papua New Guinea, Philippines, Republic of Korea, Solomon Islands and Socialist Republic of Viet Nam.

#### 3.1 General review of the antimalaria programme

Marked progress has been made over the last few decades in the reduction of morbidity and mortality due to malaria. In the Philippines, for example, the Disease Intelligence Center reported that the malaria morbidity rate fell from 336 in 1955 to 78 in 1970, that is by 77%, and the malaria mortality rate from 15.6 to 1.8, that is by 88% (the general mortality rate fell during the same period from 9.0 to 6.9, or by 23%). In the densely populated parts of many other countries, as well as in extensive rural areas, malaria has been brought under an acceptable degree of control and has ceased to be a major public health problem. With continued support for the programme and barring unforeseen developments, the present situation is likely to be maintained.

The disease has, however, remained a serious threat to health and development in some countries of the Region, particularly in remote rural areas, where the progress of the programme has, for a variety of reasons, been slow.

World-wide inflation, economic and energy crises on the one hand, and resistance of vectors to insecticides on the other, are major factors which have adversely affected the global antimalaria drive in recent years, particularly in Southern Asia.

In the Western Pacific Region, major vectors have remained susceptible to the insecticides in use, but the first set of factors has caused increased administrative and operational problems. Where adequate government and/or external support has continued to be made available, control programmes have been little affected and have continued to record further progress, albeit sometimes limited. In other programmes, particularly those where the availability of external support has been a conditio sine qua non for providing malaria control beyond a minimum, there has been little progress. In some cases there has even been a deterioration in the malaria situation. While nowhere have the setbacks become alarming, they have, in some instances, been hidden by reduced reporting capabilities.

Although some progress is expected in a number of programmes in the near future, partly because organized antimalaria operations have been introduced only relatively recently or are being re-organized, it appears that a stage without marked progress has been reached. This means that, in parts of some countries malaria will continue to be a serious public health problem, unless changes are made to mitigate the situation by attempting to reduce, remove or circumvent the major obstacles encountered. Unfortunately there are no miraculous technical solutions on hand, and the prospect of any being found in the foreseeable future is meagre. Improvements will therefore have to come from the rational utilization of techniques already available.

### 3.2 Areas requiring attention

#### 3.2.1 Overall support to the programme

One of the pre-requisites for controlling malaria on a larger scale is a political decision on the part of governments to provide the necessary long-term support to the programme. In taking that decision it must be understood that in highly malarious areas the disease will not yield easily. When it does, it is likely to return in full force unless the resources made available to achieve effective control continue in order to preserve the gains achieved. Several projects in the Region are enjoying that kind of support. In some, however, insufficient administrative, financial and logistical support, including managerial flaws, leading to interruption and delay in the implementation of operations, continue to be important factors in the failure to reach targets.

Rudimentary development of the rural health infrastructure, inadequate orientation on malaria of the general health services staff, and/or limited involvement of rural health services in the antimalaria programme, continue to restrict optimal delivery of the programme, despite considerable advances in recent years.

Apart from the support of the general health services, antimalaria programmes need to have the cooperation of other departments and agencies to carry out field operations properly. Such interdepartmental coordination appears to be difficult to effect and coordination at various echelons remains the exception rather than the rule. Development projects, particularly road construction and resettlement projects, continue to hinder the antimalaria drive because they enhance and extend the malariogenic potential of the areas being developed. Even when powerful national agencies are carrying out such development projects, the health department is rarely involved at the planning stage and frequently not at all later.

### 3.2.2 Flexibility of approach to malaria control

In 1969, projects in the Region adjusted their operations in line with the recommendations of the Twenty-second World Health Assembly which adopted a revised strategy. The adjustments, with all their consequences, proved difficult to follow through. Over-ambitious goals, involving adherence to unattainable operational plans and maladjusted personnel structures, have continued to hinder the development of optimal control programmes. Insufficient knowledge regarding the effectiveness and cost of alternative control measures, under different local conditions, has prevented a more meaningful re-orientation and re-distribution of available manpower and resources.

The continuing susceptibility of vectors to DDT and the general success of DDT house spraying operations have, in a way, prevented a search being made for alternative methods and techniques. While DDT house spraying continues to be the best methodology for achieving considerable reduction in, or even interruption of, malaria transmission in favourable ecological situations, under unfavourable conditions it has not had the expected impact, despite continuous application for many years. Difficulty of access for natural or security reasons, limited communication facilities, shortage and increasing cost of transport and local customs or habits, are among the factors playing a major role in the failure properly to protect some remote rural areas.

Institution of a search for supplementary or alternative operational methods and approaches can be justified and is urgently required. Studies should assess whether house spraying per se, or in combination with other measures, is still worth pursuing under conditions prevailing locally. People's behaviour and customs, which may interfere with the proper application of control measures or with the maintenance of results achieved, including for example the fact that they may be semi-nomadic, or the extent of their acceptance of antimalaria measures, should also be taken into account.

Such a study has recently been initiated in part of Northern Province, Papua New Guinea, where DDT indoor spraying alone and in combination with antilarval measures, will be carried out by members of the communities themselves, after proper introduction and with the necessary technical support of the malaria service.

The development of primary health care activities should offer a variety of possible arrangements for remote rural areas, where malaria remains a considerable health problem.

### 3.2.3 Manpower requirements

The malaria manpower situation has received considerable attention in the Region during the last twenty years. The international Malaria Eradication Training Centre (METC) which was in operation in Manila from 1963 to 1973, was particularly effective in providing countries with professional and senior technical staff. Of more than 1300 participants who attended the METC's 57 group educational activities, 579 came from countries or areas in the Western Pacific Region.

National training centres have provided training for technical personnel. For example, 1874 have been trained at the centre in Kuala Lumpur since it started in 1967. National training centres are in operation in Papua New Guinea, Philippines and Socialist Republic of Viet Nam and cater quite adequately for national needs. In addition the combined course held in Manila almost every year, with the cooperation of the Government of the Philippines, has proved of substantial assistance in the training of key personnel.

Training of professional staff has been more complex during recent years. The larger programmes are well staffed and there is in general moderate turnover. Lack of suitable candidates restricts the demand for basic training in malariology from the smaller programmes. As a result there has been insufficient demand from within the Region to warrant the organization of a basic course in malariology annually. The possibility of organizing such a course on an interregional basis, the better to fulfill immediate requirements for training professional staff, is being studied.

In a number of countries or areas prospects for improving the current manpower situation are linked with problems connected with the recruitment of suitable candidates to fill the posts considered to be necessary. Whereas in some instances difficulties relate to the level of remuneration and promotion and/or career prospects, the most marked shortages in the intermediate and higher echelons of antimalaria programmes reflect the output of the educational system rather than anything else. Staff of insufficient calibre are occupying posts for which they are not fully qualified. This adversely affects the management and execution of extensive and varied field operations and is a major impediment to improving their quality. The situation is sometimes alleviated by the presence of expatriate staff but in countries where it exists dramatic change cannot be expected to occur in the immediate future. In so far as is feasible, in extending technical cooperation in the field of malaria, including the development of manpower, WHO has concentrated on countries where such a situation exists.

### 3.2.4 The elusive behaviour of A. balabacensis and A. farauti

Despite the prolonged use of DDT in house spraying operations, physiological resistance to the insecticide has not developed in any of the major malaria vectors found in the Western Pacific Region. Difficulties

have however been experienced in hilly and forested mountain areas where A. balabacensis is the vector and where, due to a combination of human and vector habits, DDT house spraying alone has had a very limited impact on transmission. The situation in those areas is further complicated by the occurrence of multi-drug-resistant strains of P. falciparum, rendering mass drug administration ineffective as a supplementary measure. A. balabacensis is a major vector in parts of Democratic Kampuchea, Lao People's Democratic Republic, Malaysia (Sabah) and Socialist Republic of Viet Nam.

There is strong evidence that the effect of DDT house spraying on the survival of A. balabacensis is substantially reduced by the deterrent and/or irritant properties of the product. Since the degree of control resulting is disappointing, a trial with fenitrothion and malathion is currently under way in Sabah since they are less repelling and irritating to the vector and therefore have a more pronounced effect on vector longevity. Although a change of insecticide is not likely to alter the immediate outcome of the control programme, because other factors are involved, it could lead to a considerably improved level of control, at which supplementary measures would become more meaningful. If the study being carried out in Sabah confirms the superiority of those insecticides under the local conditions prevailing, it will be followed by further investigations to determine the most appropriate frequency and rate of application.

The technical difficulties experienced in areas of the South-West Pacific where A. farauti is abundant are of a similar nature, aggravated by the vector's habit of biting outdoors in the early evening, a phenomenon thought to have become more marked after the introduction of DDT house spraying but still not satisfactorily explained. Unfortunately no data are available on a less deterrent and less irritable insecticide having been used in the South-West Pacific for a sufficiently long period to permit comparison. The situation is different from that described above for areas in which A. balabacensis is prevalent, in that A. farauti offers better prospects for control by antilarval measures, including source reduction, larviciding and/or biological control. A number of those measures are being tried out at present in the persistent focus in Guadalcanal, Solomon Islands.

### 3.2.5 Drug-resistant malaria

Multi-drug-resistant strains of P. falciparum occur in virtually all countries or areas where the species is still prevalent, and present a serious threat where malaria has been eradicated.

As indicated above, the phenomenon causes additional complications where the administration of antimalarials is indispensable as a supplementary measure effectively to control and/or eliminate the disease.

The extent of distribution of multi-drug-resistant strains within countries is only partially known. Further studies are needed on their prevalence and degree of resistance, in order to facilitate the implementation of appropriate counter-measures. At the same time, the clinical and operational usefulness of the antimalarial drugs and drug combinations and candidate antimalarial compounds used at present should be assessed by studying the response to them of P. falciparum.

The need for collaboration in and coordination of research on drug-resistant malaria was stressed by the Western Pacific Regional Advisory Committee on Medical Research at its second meeting in April 1977, and a proposal for collaborative studies has been approved in principle. In view of the importance of P. vivax, especially in the South-West Pacific area, where Chesson-like strains occur, proposals for research include studies to determine the optimal regimen for the radical cure of vivax infections caused by that parasite species. A working group on drug-resistant malaria is to be held in Manila in May 1978 to review the proposed regional collaborative studies.