ACCELERATED IMPLEMENTATION OF MALARIA CONTROL

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Executive summary

1. The project for the Accelerated Implementation of Malaria Control (AIMC) represented an unprecedented contribution to the fight against malaria in tropical Africa, both in terms of technical support and funds. The funding provided for the project over two years is more than 12 times the contributions made by WHO during the previous decade, in spite of continuous statements on the priority of malaria control in Africa.
2. It should be borne in mind that this special WHO contribution was only about a third of what was considered in 1995 as the minimum needs for countries in tropical Africa.
3. The AIMC planning process allowed identification of the main obstacles to malaria control as well as agreement on a minimum set of essential elements which required strengthening as a basis for development of effective control.
4. The elaboration of detailed Plans of Action for each country served as a basis for initiating effective coordination of the several partners contributing to malaria control in that country. Such coordination was facilitated by the fact that WHO had become one of the main contributors in almost all the countries participating in the programme.
5. The priority given by the programme to the strengthening and quality improvement of the whole chain of case management (formal health services, community and family resources) opened the way to a real collaboration between specialised and general services, breaking away from the tendencies of the former to isolation and verticality.
6. The insistence on realistic planning and continuous evaluation considerably improved the capacity of most countries to identify weaknesses at each level of the health care system.
7. In order to ensure the continuous support of efforts at country level to strengthen national capabilities for the implementation of sustainable malaria control, the project strengthened the technical resources of WHO offices at regional and subregional levels.
8. The vast majority of countries recognise among the main contributions of the AIMC:
   - The institutional strengthening of the health services to deal with the malaria problem by creating mechanisms for the coordination of the various partners involved in malaria control, generally by establishing a National Committee.
   - A major increase (often of the order of ten-fold) in the training of health manpower in adequate malaria case management, within the health services, both for the care of severe malaria as well as for the early treatment of uncomplicated malaria.
   - The creation and support to a cascade mechanism to extend training into the periphery.
   - The establishment of sentinel site networks in the five subregions for monitoring the therapeutic efficacy of antimalarial drugs.
   - The formulation, or updating, of national antimalarial drug policies, based on the critical evaluation of therapeutic efficacy, to standardise first-line treatment and the management of treatment failures.
   - The production and publication of clear technical guidelines on the main elements of the control strategy, in particular on case management in health institutions, case management by front line workers and the prevention and control of epidemics.
   - The improvement of epidemiological information systems. In some instances this means the creation of a conscience of their importance, and the beginning of the analysis of information and a critical approach to the performance of the system. Particularly important is the capacity to identify critical problems of coverage and the inadequacy of the existing system for the care of the poverty-stricken and other possible negative effects of some aspects of the

health sector reforms, such as an increasing delay in seeking treatment.

- The introduction of effective IEC mechanisms to reach the general public.

9. It is, nevertheless, recognised that, in spite of the efforts of the project to invest in sustainable elements, improvements might not be able to be fully consolidated and may require at least a transition period to what could be considered the normal flow of external assistance. It has also been repeatedly noted that the financial weakness of the health services in most African countries will require continuous assistance for the foreseeable future.

Foreword

THIS DOCUMENT evaluates the experience of the two years of operation of the WHO project for the Accelerated Implementation of Malaria Control (AIMC) in Africa, trying to analyse its achievements, the problems encountered and the remaining challenges. The project to support intensified malaria action in Africa was a response to the increasing expressions of dissatisfaction of African countries with the insufficient attention given by the international community to malaria control.

Although the WHO contribution of US$ 20 million for 1997 and 1998 represented an unprecedented increase in external support, compared to the eighties and early nineties, this did not pretend to cover all the needs of the continent. The AIMC concentrated on certain countries and districts affected by malaria, selected on the basis of burden and absorption capacity. The project was conceived as a demonstration of the potential use of external investment funds to strengthen national capacities for malaria control.

Its most important characteristic was empowering national malaria programmes to take full responsibility in planning, management, implementation and monitoring of the activities. It was for many countries a major opportunity for development of national technical and managerial capacities in malaria control. While the project did provide some seed funds to initiate some of the required activities, it mainly concentrated on technical collaboration through the mobilisation of experts at country and inter-country levels. Major emphasis was on capacity development through cascade training on basic elements of the malaria control strategy, i.e. the improvement of case management at all levels, transmission control and community-based activities, epidemic prevention and control, and surveillance systems.

This document summarises the process and the evaluation of the experiences of the AIMC, which has been conducted at national and regional levels and which has served to the development of Roll Back Malaria in Africa. It is hoped that, by consolidating these experiences, it will serve as a further guide to the development, implementation and evaluation of many health programmes which aim at scaling-up cost-effective interventions, and particularly to Roll Back Malaria (RBM) in Africa.

Preface

THIS DOCUMENT presents the history, achievements, and lessons learned from the WHO Project for the Accelerated Implementation of Malaria Control in Africa (1997-1998), in order to share that experience among countries and partners supporting malaria control in Africa. This project, initiated with a special contribution from the development fund of the WHO Director-General, provided US$ 20 million over 1997 and 1998 for accelerating the implementation of the malaria control strategy in 34 African countries, in both the African and the Eastern Mediterranean Regions of WHO.

The preparation of the document began with a review of all documents available at WHO, including technical and financial reports from country programmes, ministries of health and collaborating agencies, such as UNICEF, USAID, DFID, JICA, and from evaluation/review teams. It also drew on statistical information from the computerised tracking system and informal consultations with the two regional offices. This was followed by visits to some selected countries by WHO consultants and the preparation of a draft document which was circulated to the regional offices for their comments. Finally, a meeting took place in Harare (14-18 February 2000) to review the draft and include complementary information.

It is expected that this document will be useful to national health authorities and Malaria Control Programme managers, as well as to UN and bilateral agencies and WHO programmes involved in the support of malaria control, particularly RBM.

Part 1.

Introduction

1.1. MALARIA EPIDEMIOLOGY/SITUATION IN AFRICA

MALARIA remains one of the most serious public health problems in tropical Africa, causing very high morbidity and mortality. In endemic areas, malaria is responsible for about 30-50% of fever cases, about 30% of all outpatient consultations and 10-15% of hospital admissions. In epidemic prone areas, malaria regularly produces severe outbreaks/epidemics with high morbidity and mortality in all age groups. Malaria transmission, being dependent on man-vector contact, is highly increased with the proliferation of mosquito breeding places associated with road construction, occupation of land for agriculture, new or poorly-maintained irrigation, deforestation, open cast mining, rapid peri-urban growth and poorly-planned economic development activities. In addition, human exposure to malaria increases considerably in many natural and human-caused disaster situations, particularly among populations displaced by war or civil unrest. The very common causes of malaria problems dependent on human activities, or "man-made malaria", were, and still can be, considered "the curse of the tropics".

The epidemiology of malaria in tropical Africa is dramatically characterised by the most powerful malaria vector system in the world. It maintains the extreme dominance of *P. falciparum* infection in holoendemic or hyperendemic conditions, except where undisturbed primary forest, high altitude or desert conditions limit the development of the *A. gambiae* complex/*A. funestus* vector system. Man-made environmental disturbances, such as agricultural development and deforestation, extension of irrigation in arid areas and desalinisation of coastal areas favour the progressive extension of the endemicity beyond its present limits. Climatic change may also contribute to its further expansion while uncontrolled urbanisation may create foci of increased transmission in areas of high population density.

Along with their high malaria endemicity, countries in tropical Africa share a weak peripheral health infrastructure and therefore urgently need national malaria control programmes (NMCP), which can guide and support the adequate implementation of the malaria control strategy at the periphery with appropriate support of the central and district levels. General health infrastructures need to be strengthened so they can provide early diagnosis and prompt treatment, both at health services facilities and at the community level, as well as the management of severe malaria. It is also essential to establish a workable epidemiological information system to guide the development of preventive interventions and, in epidemic-prone areas, the formulation of epidemic preparedness plans, which would allow the forecasting and prevention or early detection and control of epidemics.

1.2. OVERVIEW OF MALARIA CONTROL IN TROPICAL AFRICA

1.2.1 PREVIOUS CONTROL EFFORTS

Before the advent of DDT, malaria control in tropical Africa was limited to the protection of the centre of some cities and development projects, in response to perceived difficulties and political choices. The emphasis on eradication during the 1950s and 1960s created a different, but equally serious, barrier for implementing malaria control in Africa, i.e. the need to demonstrate the feasibility of eradication. This requirement limited international support for antimalarial activities to pre-eradication surveys and the running of malaria eradication pilot projects, which never succeeded in savannah areas.

In line with its Primary Health Care philosophy, the World Health Assembly adopted a strategy of malaria control in 1978. This advocated the implementation of control programmes to reduce the mortality and the socio-economic burden in Africa. Nevertheless, the implementation of this strategy was hampered by a chronic shortage of manpower and financial resources, and by the difficulty of competing with other priority programmes established in the previous two decades.

The concern of national authorities with the lack of progress of malaria control in tropical Africa motivated several WHA resolutions during the 1980s as well as the formulation of a Malaria Control Strategy for Africa in 1987, but persistent difficulties in implementation prevented satisfactory progress.

The continued concern of African countries, expressed at WHO governing bodies, was one of the main forces leading to the calling of the Ministerial Conference on Malaria Control held in Amsterdam (October 1992). A preparatory Inter-regional Malaria Conference, held in Brazzaville in October 1991, reformulated and adopted the control strategy for Africa.

The main objective of the Global Malaria Control Strategy adopted in Amsterdam was the recognition of the global nature of the malaria problem and the adoption of a global strategy for its control, which commits all countries, endemic and non-endemic to its support. As stressed in the Amsterdam Declaration (October 1992), its aim is "to prevent malaria mortality and to reduce morbidity and the social and economic losses provoked by this disease through the progressive improvement and strengthening of local and national capabilities".

Following the Amsterdam Conference, WHO convened a Study Group on the Implementation of the Global Plan of Action for Malaria Control 1993-2000 (WHO, 1993b) and a Study Group on Selective Vector Control (WHO, 1995) to provide technical guidance on implementing the strategy. Both study groups recognised that the global perspective of the strategy required an overwhelming priority for malaria control in Africa, where 90% of the world's malaria cases and deaths occur, and where malaria continues to be an important, often the main, cause of childhood mortality.

In 1995 WHO developed a Plan of Action for malaria control, which gave a clear priority to the endemic countries of Africa south of the Sahara. This plan recognised that "the present level of national resources allocated to malaria control programmes by the endemic countries does not match with the programme needs and is thus inadequate for undertaking effective and sustainable control measures. At present, national government expenditures on malaria represent on average 10% of the total public expenditure on health. This cost covers primarily the payment of salaries for national staff involved in disease management and for a limited supply of antimalarial drugs. Since the coverage of public health service is as low as 40% in many countries, many malaria patients obtain treatment outside the formal health services, often at a cost higher than available at public services. This situation means that most countries must involve the informal sector and, in most cases, seek external funding if the majority of the population who live in the rural areas are to be covered."

WHO continued to strengthen its collaboration to support long-term malaria control in Africa with other UN and bilateral agencies, including UNICEF, UNESCO, the World Bank, USAID, DFID, JICA, European Community and Italian Cooperation, research institutions and NGOs.

At the same time an African Regional Initiative on Malaria (AIM) was developed by an ad hoc committee, including representatives of the World Bank, WHO, UNICEF, selected countries and other interested partners (e.g. USAID, DFID). In January 1997, in Dakar, groups from public and private sectors, involving the World Bank, the European Commission, WHO, research institutions (US/NIH, Pasteur Institute) and funding agencies, joined efforts in a Multilateral Initiative on Malaria (MIM) aimed at strengthening research capabilities in Africa in support of malaria control.

In June 1997, the 33rd ordinary session of the Organization of African Unity (OAU) reviewed and endorsed the Global Malaria Control Strategy and issued the Harare Declaration on Malaria Prevention and Control (OAU, 1997). The declaration was made in the context of African Economic Recovery and Development, and in the broader context of the UN African Initiative of the Secretary-General.

In May 1998, the Summit of the Group of Eight industrial countries agreed to support malaria control as part of a larger plan to combat infectious and parasitic diseases (Hashimoto's Initiative).

1.2.2. POLITICAL COMMITMENT

African countries have always been aware of the serious burden that malaria represents for the health and the economy of their people, and they have expressed disappointment over the international community's lack of support for their efforts to manage the malaria problem.

Nevertheless, persistent doubts over the feasibility of sustainable malaria control in tropical Africa and the fear of entering into unlimited financial commitments, deterred development agencies from making important contributions to malaria control.

Even at national level, these doubts, often expressed by generalists, prevented the consolidation of political will into sufficient political commitment to formulate national malaria control policies.

In spite of these difficulties, growing concern motivated repeated demands at the WHA for effective support to malaria control in Africa. These were at the origin of the AIMC project.

1.2.3. FINANCIAL RESOURCES

In spite of the endorsement of the 1992 Amsterdam Declaration by all international and bilateral agencies participating in the conference, and in spite of the political support given to the Amsterdam and Harare declarations, funds to support malaria control have remained meagre. The Ministerial Conference had been conceived and organised at the end of the Cold War, when great expectations were placed on the "dividends of peace", the expectations of a major increase in the flow of funds for international development which would be derived from the end, or at least the slowing down, of the "arms race".

The global strategy recognised that most of the affected countries would need technical and financial support from the international community, and stressed the need to establish partnerships between governments and international or bilateral collaborating agencies and the private sector, for the coordination necessary to ensure continuity of action and unity of purpose. Unfortunately, the flow of external resources into Africa was not as strong as expected and malaria control in Africa, as well as the public health system itself, did not fare very well in the strong competition for external development funds.

Even if they are only a fraction of the total funds available for malaria control in Africa, the evolution of the malaria expenditure and budget of WHO, as both regular budget and extrabudgetary funds, may provide an indication of the trends of the real priority given to malaria control by the international community.

In spite of political declarations, budgets in general are much more determined by the tendency to maintain past levels of expenditure, rather than by a consideration of current problems or even changes in policy. The following tables show how little impact either the reviewed WHO malaria control strategy in 1987, or the regional strategy adopted in the Brazzaville Conference (preparatory to the Amsterdam Conference) in 1991, had on malaria control budgets:

Table 1. WHO expenditure for 1982-1993 and budget for 1994-1995 for "Malaria Control"

Year	AFRO		TOTAL WHO	
	Regular budget	Other sources	Regular budget	Other sources
Actual expenditure				
1982-83	1,124,600	144,600	16,473,900	13,570,800
1984-85	1,444,600	1,044,000	15,668,600	15,028,500
1986-87	2,327,300	405,400	15,823,700	14,881,400
1988-89	1,995,900	624,900	15,794,100	12,498,200
1990-91	1,435,000	957,800	14,386,000	8,374,600
1992-93	—	—	16,520,000	11,935,600
Budget estimate				
1992-93	1,555,000	895,200	16,836,100	2,387,900
1994-95	—	—	19,121,400	4,149,700

From 1992-95 the presentation of the WHO project and budget does not identify malaria control as a distinct category, but merges it within "integrated control of tropical diseases". Only for the

whole of WHO, is there a comparison between the actual expenditure on malaria in 1992-93 with the budget for 1994-95. There is no report of actual expenditure on malaria control in AFRO for the biennium 1992-1993.

Over the period 1992-95 the consolidated budget for "tropical diseases control" is as follows:

Table 2: Expenditure for 1992-93 and budget for 1994-95 for "Tropical Diseases Control"

Year	AFRO		TOTAL WHO	
	Regular budget	**Other sources**	**Regular budget**	**Other sources**
Actual expenditure				
1992-93	2,108,800	519,800	34,440,600	87,846,100
Budget estimate				
1994-95	1,977,100	–	36,611,800	81,379,800

The presentation of the programme and budget for 1996-1997 changes again, eliminating most details, so that it is not possible to continue the evolution of the funds available for malaria control.

However, it is clear from these figures that, in spite of the Amsterdam and Harare declarations, funds for malaria control did not change significantly during the 1980s and early 1990s. In spite of the recognised fact that Africa suffers around 90% of the malaria problem, it received less than 10% of the funds.

It is also interesting to notice that during the same period the total funds available for malaria control for the whole world, both regular and extrabudgetary, were consistently equivalent to half those available for the "Onchocercosis Control Programme" for 11 countries in West Africa.

Economic realities suggest that many malaria-endemic countries will continue to require external support. In many instances, there is a need to improve cooperation between all agencies interested in malaria control—international, bilateral and NGOs—and also to seek out new partners. Existing Plans of Work emphasise the technical function of WHO, and aim to ensure the best possible quality of technical support to countries. Nevertheless, numerous problems of organisation and functioning of services, manpower development and maintenance, coverage and penetration to the periphery, sustainability, intersectoral cooperation and coordination still persist.

It is felt that:

- The best guidelines and technical advice would be ineffective, without improving programmes' ability to overcome the operational problems which are hampering implementation and penetration to the periphery.
- WHO, with its capacity of regional and global overview, has an essential contribution to make to that improvement, by consolidating, validating and disseminating countries' experiences, provided it is given the appropriate means for the task.

Part 2.

Objective, process and monitoring of the project for the Accelerated Implementation of Malaria Control in Africa

THE 1995 Plan of Action for Malaria Control in Africa had estimated that the minimum needs for external financial support to launch viable control programmes, in line with the global malaria control strategy, amounted to the order of US$ 26 million per year, which could be channelled through bilateral or multilateral arrangements.

In view of the slow development of financial support, African countries presented the problem to the World Health Assembly, which in May 1996 adopted resolution WHA 49 (11 May 1996), requesting that efforts be made to increase resources to intensify WHO's action in malaria control, to reinforce the malaria training programme at country, regional and global levels, and to explore the possibility of establishing a special programme on malaria prevention and control.

In response to this resolution, WHO made an additional contribution of US$ 10 million, from the Director-General's Special Fund, for the Accelerated Implementation of Malaria Control in Africa for the year 1997. Following evaluation, this special contribution was continued, at the same level of funding, during 1998. This "Project for the Accelerated Implementation of Malaria Control in Africa" represented a special contribution, in addition to the allocated WHO budget, and involved both the African and the Eastern Mediterranean Regions of WHO, to include all African countries south of the Sahara with serious problems of endemic malaria.

2.1. OBJECTIVE

The primary objective of the project was to establish or reinforce the foundations for the further development and implementation of sustainable malaria control, thereby preventing mortality and reducing morbidity due to malaria.

2.2. THE PROCESS OF ACCELERATED IMPLEMENTATION

2.2.1. PREPARATORY PHASE

WHO provided contributions from the DG's Special Fund, totalling US$ 20 million, to the AIMC in 1997-1998. However, even this unprecedented special contribution could not meet the minimum needs of all the 45 malaria-endemic countries in tropical Africa. Consequently, a number of countries had to be selected for the project.

Steps in the preparatory phase:

- 7 November 1996: Extra WHO resources were made available for a one-year project designed to build a foundation for sustainable malaria control in Africa, requiring funds to be obligated before 31 December 1997.
- December 1996: AFRO and EMRO, in collaboration with CTD/Headquarters, prepared the first draft project proposals and submitted them to the DG.
- 24 January 1997: Final version of the 1997 Plan of Action was prepared and submitted to the DG, including the list of countries selected in AFRO and EMRO and the respective amount for each country. US$ 9 million was allocated to AFRO and US$ 1 million to EMRO.

2.2.1.1 SELECTION OF COUNTRIES

Since the available funds did not meet the minimum needs of all 45 endemic countries of Africa, it was decided to use the funds to demonstrate the feasibility of the strategy and to initiate its implementation in as many countries as possible, concentrating activities in selected districts in each country.

The following criteria were set for the selection of participating countries:

- Governments which had shown political commitment to malaria control but lacked many of the necessary requirements for sustainable implementation:
- Ability to produce results, including availability of managerial teams at central and district levels of the country; availability of functional districts; availability of a functional system for the procurement and distribution of essential drugs;
- The epidemiological situation, taking into account epidemic-prone areas;
- Absorption capacity;
- Insufficiency of other external support resources to the country's national programme during 1997; and
- An estimation of the country's stability during 1997.

In addition to the endemic countries selected for AIMC interventions, special attention was given to four endemic countries affected by civil war, namely Angola, Burundi, Liberia and Sierra Leone. Priority control activities, supported in complex situations together with NGOs, focussed on setting up emergency stocks of drugs and supplies to strengthen management of severe malaria in selected hospitals and to respond quickly to epidemics.

Emphasis was placed on training clinicians and nurses in disease management, as well as on ITN implementation in areas where security was recognised as satisfactory. In Burundi, clinicians and nurses working in regional/district referral hospitals were trained in management of severe malaria and involved in developing locally-adapted training materials. Assistance was given to the MOH/NMCP and NGOs to strengthen the surveillance system, including relevant malaria indicators, in order to improve early recognition of epidemics and to implement control measures in a timely manner. Sanitary workers and people involved in private sewing factories were trained to impregnate locally-made mosquito nets, and IEC materials have been produced to increase public awareness.

In all, 21 countries and four civil war-affected countries in the African Region of WHO were selected to receive a total of US$ 9 million and three African countries of the Eastern Mediterranean Region were to receive a total of US$ 1 million. In 1998, the project extended its support to six additional African countries, as shown below (2.2.1.3)

2.2.1.2 IDENTIFICATION OF PRIORITY INTERVENTIONS

The selection of priority activities for the project was based on an assessment of the main problems faced by the selected countries for the implementation of the strategy's main elements.

The project's Plan of Action (WHO/AFRO, 1997) characterised the malaria problem of Africa as:

- 74% of the population of the WHO African Region live in malaria-endemic areas, generally without any individual or collective means of protection.
- Nearly 18% of the population live under the threat of epidemic manifestation of the disease.
- Malaria remains the most important health problem in Africa, accounting for 30 to 50% of consultations in most health services with fatality rates of up to 40% in severe cases.
- 70 to 80% of malaria patients receive generally inappropriate treatment outside of medical services, often resorting to traditional medicine or unsupervised self-medication. It is therefore important to strengthen community involvement in order to improve malaria case management.
- Malaria parasite resistance to chloroquine (first line drug) is not being systematically monitored. However, in some areas of the region, especially in eastern and southern Africa, the level of resistance appears to be high.
- The quality of malaria case management in health services is quite poor due to inadequate training of personnel, lack of appropriate supervision and drugs and the weak purchasing power of the population.

- Although a number of people have already been trained in malaria control this activity should continue, to ensure a critical mass of health workers to effectively fight the disease.
- Particular efforts should be made to ensure, mainly through supervision activities, that trained health workers effectively participate in malaria control.
- Most national programmes are at an early stage of development, some only at the planning phase.
- In most countries, there is a serious lack of coordination between the control programme, research institutions and various partners engaged in malaria control.

2.2.1.3 ALLOCATION OF FUNDS

Over 1997-98, US$500,000 was allocated to support countries in civil war. The remaining funds were allocated to in-country and inter-country activities as follows:

Table 3: Allocation of funds between in-country and inter-country activities

Type of activity	African Region		Eastern Mediterranean Region	
	1997	**1998**	**1997**	**1998**
In-country	71%	74%	88%	80%
Inter-country	29%	26%	12%	20%

AIMC distributed the in-country funds over the main categories of activities identified in the planning process as follows:

Table 4: Allocation of in-country funds between main categories of activities

In countries of the African Region	
Disease management	25.4%
Vector control, including insecticide-impregnated materials	20.4%
Community-based case management	25%
Epidemic prevention and control	10.4%
Strengthening of health information systems	10.8%
Transport and supplies	8%
In countries of the Eastern Mediterranean Region	
Disease management	18.9%
Vector control, including insecticide-impregnated materials	5.7%
Peripheral case management, monitoring of drug resistance	11.3%
Epidemic prevention and control	31.6%
Strengthening of health information systems	1.4%
Technical support, upgrading facilities	31.1%

The allocation of funds to individual countries was based on:

- population size;
- percentage of population in stable and unstable malarious areas;

- current major sources of external funding for malaria control; and
- estimation of absorption capacity.

Funds allocated to the selected countries in the African and the Eastern Mediterranean Region were as follows:

Table 5: Allocation of funds for direct support to countries

Country	Amount in US$	
	1997	1998
Countries from AFRO selected in 1997 to join AIMC		
Benin	321,245	200,000
Botswana	97,455	95,000
Burkina Faso	332,245	200,000
Chad	219,480	170,000
Comoros	110,850	90,000
Côte d'Ivoire	315,345	200,000
Ethiopia	977,489	700,000
The Gambia	165,214	110,000
Ghana	453,070	300,000
Guinea	277,400	280,000
Kenya	314,220	200,000
Malawi	328,210	250,000
Mauritania	187,154	180,000
Mozambique	367,170	280,000
Namibia	83,625	90,000
Rwanda	206,575	200,000
Senegal	182,505	220,000
Tanzania	605,908	370,000
Togo	298,065	270,000
Zambia	344,848	250,000
Zimbabwe	199,660	255,000
Countries selected in 1998 to join the AIMC		
Cameroon	—	200,000
Democratic Republic of Congo	—	500,000
Mali	—	165,000
Niger	—	165,000
Nigeria	—	600,000
Uganda	—	160,000
Sub-total	**6,387,723**	**6,700,000**

Countries selected from EMRO to join AIMC		
Djibouti	82,000	100,000
Somalia	200,000	200,000
Sudan	600,000	500,000
Sub-total	**882,000**	**800,000**
Countries in civil war		
Angola	60,000	120,000
Burundi	80,000	100,000
Liberia	30,000	40,000
Sierra Leone	30,000	40,000
Sub-total	**200,000**	**300,000**
TOTAL	**7,469,723**	**7,800,000**

Table 6: Allocation of funds for inter-country activities in 1997

In AFRO	**Amount in US$**
Production of training materials	193,000
Provision of antimalarial drugs and therapeutic efficacy studies	1,089,277
OAU meeting and inter-country meetings	380,000
Monitoring and evaluation missions	160,000
Technical assistance, including the use of international and national consultants	590,000
Sub-total	**2,412,277**
In EMRO	
Technical assistance, including the use of international and national consultants	118,000
TOTAL	**2,530,277**

Table 7: Allocation of funds for inter-country activities in 1998

In AFRO	**Amount in US$**
Emergency supply of drugs	200,000
Antimalarial drug efficacy tests	150,000
National consultants	370,000
External consultants	435,000
Country missions by WHO staff	150,000
Country missions by temporary advisers	40,000
1999 joint planning meeting (CTD/HQ, MAL/AFRO)	20,000
Review meeting with national consultants	60,000
WHO staff meeting for situation analysis	45,000

Workshops to develop POAs for epidemic prevention	
Southern African countries	45,000
East & Great Lake countries	30,000
Sahel countries	60,000
Internet connectivity for National Malaria Control Programmes	65,000
Assessment of programme of Senegal, Togo & Zimbabwe	60,000
Multicentre study on severe malaria in selected referral hospitals	200,000
Sub-total	**2,000,000**
In EMRO	
Technical assistance, including the use of international and national consultants and review meetings	200,000
TOTAL	**2,200,000**

2.2.1.4 DEVELOPMENT OF COUNTRY PLANS

The project was planned and carried out under the following conditions, prevailing in most of the countries:

- Most programmes do not have a regular government budget for malaria control activities, and depend on extra-budgetary resources.
- Malaria control programmes have an acute shortage of the manpower necessary to guide and provide technical support to health institutions (public and private) on malaria control, to advocate for control, to monitor and evaluate programme activities and to coordinate all the partners interested in malaria control.
- Most programme managers have limited experience in undertaking and monitoring large-scale malaria control activities.

In view of these circumstances, WHO assisted the implementation of the project by collaborating with representatives of Ministries of Health and National Malaria Control Programmes to develop realistic Plans of Action according to countries' priorities, through the following meetings:

- 4-17 February 1997, Brazzaville: Based on the general Plan of Action, detailed plans were prepared for the 20 African countries (exception Mozambique), by National Programme Managers and senior health officials. Following the general identification of priority activities and the allocation of resources, detailed Plans of Action were elaborated in each country in accordance with epidemiological needs. No uniformity was imposed in the relative importance given to the different elements of the strategy.
- 1-4 March 1997, Alexandria: Similar plans were prepared by national responsible officers for the three selected EMRO countries.
- Following the analysis of the mid-term reviews, general plans for 1998, including the allocation of resources, were elaborated during two meetings, in Khartoum (for EMRO members) from 15 to 28 November 1997, and in Kampala (for AFRO members) from 16 to 21 December 1997.

Based on the evaluation of the 1997 implementation new, detailed Plans of Action were elaborated in all countries for the extension of the AIMC project for 1998. They were prepared on the following basis:

- Consolidation of the strategic activities planned and implemented during 1997;
- Extension of the project to districts and areas of the selected countries which it did not yet cover;

- Improvement of the communication systems, to facilitate detection of constraints and sharing of experiences;
- Improvement of coordination between different partners; and
- Support of necessary operational research.

Planning and allocation of funds took into account the following factors in each country:

- An assessment of levels of implementation in 1997 and the country's current capacity for implementation, the reports received, the equipment provided, the involvement of other partners and the social situation in the country;
- The magnitude of the malaria problem; and
- The size of the population.

The 1998 plans, which supported the same general activities selected in 1997, allowed more flexibility in their adaptation to the needs of each country. The development of comprehensive Plans of Action to facilitate collaboration with other partners was emphasised.

2.2.2. IMPLEMENTATION PHASE: PRIORITY INTERVENTIONS

The AIMC funding was an investment in building programme capacities and, therefore, concentrated its efforts in improving managerial and technical capabilities, through training, formative supervision and the strengthening of information systems.

AIMC recognised that the malaria problem was the result of the relationship of people to their social and physical environment and, as a consequence, malaria control could not be achieved without the active involvement of the communities and all sectors of the economy, who contribute to modify those relations. It insisted in establishing intra- and intersectoral coordination mechanisms.

The project supported a number of activities, as listed below. It is recognised that most of the activities reinforce each other and contribute to the overall improvement of programme capabilities.

2.2.2.1. PROGRAMME MANAGEMENT

In accordance with the Global Malaria Control Strategy, the AIMC project accelerated the integration of malaria control programmes into the general health services. In particular, it strengthened the normative capacity of the central core of specialists in planning, monitoring and evaluation; the implementation ability of the general health services for case management at all levels; the use of information; and the support of preventive measures. In most countries, health services are decentralised and, due to the limitation of funds, the project was implemented in only a selected number of districts.

In order to facilitate the management of the programme, most countries established a multidisciplinary National Committee to assist in planning, programme support and evaluation. This committee aimed at ensuring intra- and intersectoral collaboration by including other government departments, research institutions and international and bilateral agencies and other partners supporting malaria control.

In addition, the project facilitated the recruitment of National Consultants (or Programme Officers) to support technical functions at the centre, to facilitate administrative procedures and to reinforce links between Ministries of Health and WHO.

The participation of external partners in the support of malaria control has always varied considerably between different countries. In many countries there has been long-term collaboration between various institutions and external agencies supporting the general health services, thus indirectly contributing to malaria control. AIMC advocated and supported the collaboration of all partners.

All countries have been encouraged and supported in the formulation and publication of National Malaria Control Policies.

In addition to training activities, efforts have been made to communicate the policy through supervision and IEC activities. Nevertheless, this has to be a continuous process and, due to the limitation of funds, is still far from optimal. It comes as no surprise that in several countries the evaluation teams found important gaps in the knowledge of general health services staff about the National Malaria Control Policy.

Improved management and coordination has strengthened collaboration among partners, encouraging the elaboration of joint Plans of Action, involving all partners.

Formative supervision of peripheral services constitutes an essential element for the consolidation of the accomplished improvements, but in many countries supervision, particularly at the regional and district levels, was still very weak, lacking sufficient (or sufficiently motivated) personnel, transport and time. The resources for supervision, therefore, often remained quite centralised and did not allow sufficient coverage to ensure the required formative supervision.

2.2.2.2 DISEASE MANAGEMENT

The main emphasis of the project was to ensure the capacity of the health system to undertake appropriate management of uncomplicated and severe malaria at all levels where care was sought. As a basis to accomplish that, a major programme of training was conducted in all countries.

The training programme began with training of trainers (TOT) at the centre, followed by cascade training into districts, health centres and finally into communities. This final stage progressively involved clinicians and paediatricians, nurses and medical officers, assistant nurses, midwives, traditional birth attendants and community health workers. Training has been supported with the preparation and distribution of training materials, technical guidelines and posters, drug packages and support to formative supervision.

Table 8. Distribution of personnel trained in disease management (1997-99)

(Countries for which there is full information available)

Country	Severe case management			Uncomplicated case management			Microscopic diagnosis		
	1997	**1998**	**1999**	**1997**	**1998**	**1999**	**1997**	**1998**	**1999**
Angola	67	63	—	84	53	—	42	55	—
Benin	185	132	18	1410	686	127	—	—	29
Burkina Faso	894	489	346	5036	900	—	26	11	19
Comores	48	34	94	—	—	—	11	4	9
Ethiopia	288	187	—	1903	472	—	109	—	—
Guinea	167	123	290	95	55	832	30	—	80
Liberia	—	16	134	—	—	—	—	—	15
Mali	—	43	140	—	35	—	—	—	15
Mauritania	373	98	320	15	209	621	23	21	6
Mozambique	235	200	204	222	210	22	37	60	11
Namibia	177	1	—	—	—	—	10	12	—
Niger	—	512	—	—	—	325	—	18	18
Rwanda	11	85	—	94	34	—	75	59	—
Chad	—	40	13	123	—	—	22	20	22
Togo	1153	603	45	60	—	39	61	48	66
Zambia	52	—	—	35	—	—	45	68	15
Total	**3650**	**2626**	**1604**	**9077**	**2654**	**1966**	**491**	**376**	**305**

Unspent funds for 1998 were used in 1999

Table 9. Distribution of personnel trained in disease management (1997)

(Countries for which only information for 1997 was provided)

Country	Severe case management		Uncomplicated malaria	Microscopic diagnosis
	National	Periphery		
Botswana	37	—	—	30
Burundi	16	220	—	—
C. d'Ivoire	42	44	115	48
Gambia	—	106	217	6
Ghana	—	318	1269	—
Kenya	8	64	194	40
Malawi	51	165	—	21
Senegal	50	351	1053	12
Tanzania	51	991	598	32
Zimbabwe	35	240	120	—

Missing information: Cameroon, DR Congo, Nigeria, Sierra Leone and Uganda

More detailed information on the training by categories of health personnel is available for some countries. For example:

In Ethiopia, training activities during 1998, up to September, included:

- 10 instructors from medical schools and 14 instructors from public health colleges were trained in management of severe malaria;
- 29 physicians were trained in management of severe and complicated malaria (funds transferred to the regions in August 1998);
- 22 health assistants were trained in management of uncomplicated cases, malaria control strategies and prevention and control of epidemics (funds transferred to the regions in August 1998); and
- 36 nurses from hospitals and health centres were trained in management of uncomplicated and severe malaria cases.

Another example, where more comprehensive data have become available, is Togo. In Togo, cascade training in the management of malaria involved 99 physicians, 121 medical assistants, 40 interns, 940 nurses, 339 midwives and 217 auxiliary midwives. In the microscopic diagnosis as well as for therapeutic efficacy studies, training sessions involved 60 senior laboratory technicians and 115 laboratory technicians.

In Sudan, cascade training in the management of severe malaria involved 160 specialists (60 paediatricians, 75 general physicians and 25 obstetricians) and 160 medical officers, and, in the management of uncomplicated malaria, 152 medical assistants and 2090 community health workers. In the microscopic diagnosis cascade training involved 80 trainers, who trained 260 laboratory technicians and 362 laboratory assistants.

In most countries, guidelines for case management, both for severe and for uncomplicated malaria, were prepared and distributed to support clinical practice by trained personnel and were often displayed as posters in clinics and outpatient consultation rooms.

This training effort resulted in a clear improvement of the quality of case management at all levels, as shown by the comparison of clinical practices in seven countries which underwent two external evaluations, in the third quarters of 1997 and of 1998:

Table 10: Management of inpatient severe malaria cases before and after training

(According to a mid-term review in seven countries)

	Before training	After training
Proportion of laboratory-confirmed diagnosis	6.1%	42.5%
Proportion of correct treatment	12.2%	61.2%

The recorded increased use of the laboratory in diagnosis could be the result of increased demand by retrained clinicians and an improved performance of laboratory technicians due, not only to training, but also to the strengthening of laboratory resources and logistics, supported by the project.

An important development, encouraged by AIMC, has been collaboration with the programme for Integrated Management of Childhood Illness (IMCI). Malaria control programmes see IMCI as a very important partner for training and support in the management of uncomplicated malaria. AIMC has supported the development of common training materials for malaria and IMCI workers and the training of the latter in malaria control. In some countries, the national director, or coordinator, of the malaria control programme has also been trained as a trainer in IMCI. Three staff members of the Malaria Unit at AFRO have also been trained in IMCI.

The main constraints identified in the process of improving disease management, and where future support is considered necessary, are:

- The tendency of some health workers to return to previous practices and the continued pressure of drug salesmen in hospitals and main health centres. These should be counteracted by strong support to formative supervision.
- The irregular and limited use of generic drugs. This is particularly noticeable in the case of hospital pharmacies, which often offer a wide range of commercial trade marks as well as the generic antimalarials, but which in some cases offer only commercial varieties.
- The circulation of a variety of different drug formulations with different content per tablet (e.g. chloroquine of 100, 150 or even 250 mg base).
- The increasing circulation of fake drugs in most markets.
- The weakness of regulatory and quality control mechanisms.
- The cost of treatment (consultation, laboratory examination and drugs) and the non-existence, in most countries, of ways of caring for the poverty-stricken.
- The limited availability of safe blood for treatment of severe anaemia.
- The need to strengthen the network of laboratories to ensure the availability of microscopy for the differential diagnosis of severe cases and treatment failures. It will be necessary to establish, in most countries, some mechanism for quality control and maintenance of microscopes and strengthening the logistics of consumable supplies.
- The high turnover of staff, particularly at peripheral health units.

It should be noted that, in most countries, the possibilities for increasing the coverage of health services were limited by a freeze in recruitment of staff imposed by the general economic policies of the countries and international financial institutions. This is particularly evident in the case of laboratory services—all training in microscopy was actually refresher training of existing microscopists.

There is ample evidence that AIMC has made a major contribution to the improvement of the quality of disease management in the health services. Nevertheless, there remain some problems which require increased attention:

- Some Malaria Control Programme managers and collaborating clinicians are becoming interested in the problems of access to proper treatment and how it may be affected by improved quality of services, particularly as a consequence of the universal "payment for services".

Negative effects may include: a) a lack of access to adequate care for a number of the indigent population; b) a delay in treatment seeking by an important fraction of the population, and c) informal or self-prescription of affordable or inadequate drugs or drugs in insufficient dosages.

- Problems of coverage of the population with adequate services, including the incentives for peripheral staff and for community health workers
- Problems of compliance with treatment, since there is no mechanism to monitor that patients acquire full treatment courses from the market.

Some countries are exploring solutions to these problems. For example, Burkina Faso is establishing, with the support of the European Union, a procedure to provide an annual subsidy to National and Regional Hospitals (11 in total) for the adequate care of paediatric emergencies. A fund of 150 million CFA (1.5 million FF or US$ 220,000) will be made available immediately and will be reviewed based on the analysis of performance.

An essential element of adequate case management is the proper use of safe and efficacious drugs, so AIMC has supported the establishment of a functional mechanism for the monitoring of therapeutic efficacy of antimalarial drugs at country level, the consolidation of information and its use to review and update national antimalarial drug policies.

The basis for this mechanism was the strengthening of countries' capacity to formulate and review their antimalarial drug policies by training clinicians and nurses in the performance of therapeutic efficacy tests and the establishment of a monitoring programme.

A network was established for the performance of standardised antimalarial therapeutic efficacy tests. The following sites have been funded:

Table 11: Network of countries in AFRO with sentinel sites for monitoring drug efficacy

Angola	1	Eritrea	3	Niger	3
Burkina Faso	3	Gambia	2	Nigeria	4
Botswana	3	Ghana	4	Rwanda	3
Burundi	3	Guinea	2	Senegal	3
C. A. R.	2	Kenya	1	Sierra Leone	1
Cameroon	4	Liberia	2	Tanzania	7
Chad	3	Mali	3	Togo	3
Comoros	2	Mauritania	3	Uganda	3
Côte d'Ivoire	3	Mozambique	2	Zambia	2
Ethiopia	7	Namibia	2	Zimbabwe	4

Sites in C.A.R. and Eritrea have been funded from other sources

Based on the results of therapeutic efficacy studies by 2000, five countries have updated their antimalarial drug policy (Botswana, Ethiopia, Kenya, Malawi and Zambia), nine are in the process of doing so (Eritrea, Gambia, Mozambique, Namibia, Nigeria, Rwanda, Tanzania, Uganda and Zimbabwe) and two are obtaining additional information (Guinea and Sierra Leone).

2.2.2.3 VECTOR CONTROL

The use of insecticide-treated mosquito nets, curtains or other materials (ITM) has been the main transmission preventive measure considered by most countries in tropical Africa. Bednet use is recognised as one of the best methods for personal protection against malaria. However, its potential as a malaria control measure in any population depends, to a great extent, on the degree of involvement of the public and private sector in the support of bednet availability, acceptability

and accessibility. In general, African countries consider bednets to be one of the main measures for malaria prevention, but they remain a trade object, with some participation by the health services in their promotion, in the provision of distribution outlets or in the support of their manufacturing and marketing. The health services do however promote the use of bednets through IEC activities in connection with the private sector and NGOs operating at community level.

The support of the use of impregnated bednets has been adopted as the main transmission control measure in 11 countries: Benin, Burkina Faso, Chad, Comoros, Ethiopia, Ivory Coast, Mauritania, Senegal, Tanzania, Togo and Zimbabwe.

AIMC has supported this activity by training, collaborating in the establishment of impregnation centres, and by providing initial stocks of bednets and insecticides to initiate marketing. An important activity in some countries has been to support local production by providing netting material and sewing machines to workshops organised by women's associations, with the aim of creating income-generating projects. All these efforts have received important contributions from other partners, such as UNICEF, DFID and a number of NGOs.

Training in impregnation techniques for bednets and other materials for personal protection, therefore, constituted one of the fundamental activities of the AIMC project. According to available information the following personnel were trained:

Table 12. Distribution of trained personnel in vector control (1997-99)

	1997	1998	1999		1997	1998	1999
Benin	225	195	—	Kenya	11	—	—
Botswana	30	—	—	Mali	44	—	45
Burkina Faso	—	12	11	Mozambique	400	400	400
Chad	30	27	30	Namibia	79	—	—
Comoros	16	10	—	Niger	20	42	62
C. d'Ivoire	194	—	—	Rwanda	40	68	—
Ethiopia	140	112	—	Togo	90	24	58
Guinea	142	291	479	Zambia	410	68	—
Mauritania	113	164	110	Zimbabwe	240	—	—

Unspent funds in 1998 were used in 1999

As for training for case management, additional details are available from some countries. Data from Burkina Faso indicate that WHO had provided 6,000 bednets and AIMC had trained 12 technicians to staff the first impregnation centres. This was in addition to the country's well-established resources, at the Centre National de Lutte Antipaludique and the Centre Muraz, which had been pioneers in the study of impregnated materials. Now there are one or two centres per district, under the supervision of the Environmental Health Service. There are also numerous NGOs providing bednets and impregnation services, although often in an uncoordinated manner.

In Ethiopia:

- 115 vector biology and control technicians and 83 zonal health management staff were trained in vector control policy, planning and impregnation and use of bednets; and
- 54 CHWs were trained in impregnation techniques and environmental management activities.

In the case of Togo, up to the end of 1998, 16 senior sanitarians and 98 health assistants had completed their training in impregnation techniques and the running of impregnation centres.

AIMC has also supported capacity strengthening for indoor residual insecticide spraying as part of epidemic preparedness in epidemic-prone areas. This included training, reorganisation of teams, logistics support for spraying operations and also for testing the susceptibility of local vectors to insecticides.

Perhaps the most important constraint is the cost of both bednets and insecticides which, in spite of efforts to diminish procurement, distribution and impregnation costs, remains high in relation to most people's purchasing power. The cost of regular re-impregnation is even more of a barrier. This is particularly true in rural areas, where the malaria burden is the greatest. Although there are some places where bednets may not be acceptable to the people, the main barrier appears to be their price, which for a large proportion of the population remains too high, even if it is considerably less (often less than half) than in the open market.

Another problem has been the lack of specifications regarding bednet sizes. This has been noted, in some countries, where the bednets acquired from the international market, including some provided by WHO and UNICEF, were too small, requiring the sale of those labelled one and half or double as single and as those labelled three-places as double. The most serious objection appears to have been the height of the bednets, which at only 1.5 metres, is generally found to be uncomfortable.

A framework has been developed for the monitoring and evaluation of the use of insecticide-treated materials and for the support of their large-scale use, including the strengthening of the capacity for testing insecticide susceptibility.

2.2.2.4 COMMUNITY-BASED ACTIVITIES

AIMC, often in collaboration with other partners, has promoted the sensitisation of community leaders through various social mobilisation activities and community action, including training.

Important activities have included the production and diffusion of IEC materials and the organisation of community-level advocacy meetings. In most countries "Malaria Awareness Weeks" (*Journées de la Santé* in francophone countries) have demonstrated a great success in creating awareness of the importance of prompt malaria case management, as well as in promoting the use of ITMs. This is reflected, for example, in increased purchase of impregnated bednets following such events.

The project also supported the training of volunteer community health workers in the proper management of fever at home and the use of impregnated bednets. Whenever possible, it has supported the training of existing community health workers, e.g. Guinea Worm agents, in the management of uncomplicated malaria at community level

The mobilisation of women's associations has been initiated in some countries, but still requires strengthening and continuous support. There are considerable differences between countries in the strength of community associations, which are often too recently-formed, have limited coverage and are not yet well consolidated.

2.2.2.5 EPIDEMIC PREVENTION AND CONTROL

Ten out of the 21 endemic countries initially selected for AIMC have regions or districts, mainly in highland areas, prone to malaria epidemics: Botswana, Ethiopia, Kenya, Mauritania, Mozambique, Namibia, Rwanda, Tanzania, Zambia and Zimbabwe. They have been technically and financially supported to develop preparedness plans of action for malaria epidemics.

The main activities supported in these countries have focussed on training activities for district medical officers and the district health team. These have been undertaken jointly with other partners and with the support of Health Information Systems (HIS) experts. Their purpose was to develop district-based, budgeted, preparedness plans of action including the setting up of early detection systems within the HIS, decentralised emergency stocks of drugs and other relevant supplies. Such training activities have been carried out in parallel with the development and production of national and district guidelines incorporating technical aspects on early recognition, notification, control options and post-epidemic analysis (lessons learnt) of interventions expected to make an impact on malaria morbidity and mortality.

In some countries, such as Ethiopia, peripheral health workers, nurses and health assistants have been trained, not only to recognise and notify unusual situations, e.g. an increasing number of morbidity/mortality cases, but also to actively participate at the planning stage in the rapid implementation of pre-defined control measures such as indoor residual spraying interventions.

An important aspect highlighted and discussed during the various training meetings was to strengthen the Health Information Management System (HIMS) at all levels as a basic tool to detect epidemics in a timely manner. Efforts have been made to better define and quickly analyse data collected in health care facilities as an essential part of the early recognition of epidemics.

In three locations (Dakar, Harare and Kampala) the Regional Office for Africa has established emergency stocks of antimalarial drugs such as sulfadoxine-pyrimethamine (SP) tablets to respond quickly to emergency needs in sub-regional settings (Western, Eastern and Southern African countries).

AIMC has also promoted the formulation of epidemic preparedness plans for epidemic-prone areas. With the assistance of the project seven countries have actually developed plans—Botswana, Ethiopia, Kenya, Mozambique, Namibia, Rwanda and Zimbabwe.

An essential element of preparedness is the identification of epidemic determinants and indicators of epidemic risk which, in most epidemic-prone areas, are linked to meteorological cycles. AIMC has initiated collaboration with meteorological departments in order to analyse historical records to identify the relationship between cycles of abnormal rainfall, temperature or relative humidity and malaria epidemics in different areas. Such studies will permit the establishment of systems of preparedness, forecasting and early detection to guide preventive or control actions.

These activities were promoted through workshops and training of health staff in early detection and control of epidemics:

In addition to training the project also supported:

- production of guidelines and preparation of district Plan of Action (epidemic preparedness) in selected geographical areas; and
- training of health services and storekeepers in the procedures to ensure adequate supplies as part of an epidemic preparedness plan.

For example, the 1998 review for Ethiopia indicates that:

- guidelines were finalised for malaria epidemic prevention and control, including recommended actions for strengthening monitoring in the peripheral health facilities, as well as for the central monitoring and surveillance system;
- 512 district health officers were trained in epidemic monitoring and control ;
- nurses and health assistants were trained in epidemic management; and
- an epidemic preparedness plan was elaborated for each zone concerned with epidemic risk.

The Southern Africa Malaria Control Programme, with the support of AIMC and other partners, has greatly advanced the study of historical records and the strengthened collaboration of national antimalarial programmes and meteorological departments in order to develop epidemic preparedness in the countries of the sub-region. Particularly fruitful has been the collaboration with the Liverpool School of Hygiene & Tropical Medicine in the use of medium-term meteorological forecasting and in the strengthening of countries' capacity in this field.

An essential element of epidemic preparedness is the strengthening of the health information system to ensure the recognition and immediate reporting of abnormal situations. This has been an important part of training health workers in data management. Such reporting of abnormal situations is particularly important in the case of epidemic determinants associated with non-predictable natural phenomena, with human activities (man-made malaria) or with population movements.

It has to be noted that, while substantial advances have been made in some countries in general preparedness, early detection and response, epidemic forecasting is in its very early development. Considerable work needs to be done in the identification of local risk factors, since meteorological forecasting remains unreliable at the local level. Forecasts should be considered as early alert signs, which should be followed by monitoring locally relevant alarm signals.

One constraint which needs to be overcome is the slowness of local and national information sharing, which in some countries is complicated by the need to pay for meteorological information.

2.2.2.6 STRENGTHENING INFORMATION AND COMMUNICATION

Common features of epidemiological reports from endemic African countries have been their irregularity, gaps in reporting coverage, as well as the lack of standardised case definitions, proper analysis and use of the information collected. The lack of interest in epidemiological information is shown by the lack of collections of past reports in most Ministries of Health or in reporting institutions.

There have been several previous efforts to improve epidemiological information, including malaria data, in Africa. Generally this has been as a result of the implementation of priority health programmes. However, most were short-lived and the health services have continued to work on a day-to-day basis.

In all its training activities AIMC has stressed the fundamental importance of the health information system in planning and evaluating any intervention, as well as in identifying and responding to problems.

Furthermore, in order to measure progress, AIMC has made a special effort to insert, whenever relevant, basic epidemiological indicators within the Health Information System. It has also helped develop, in collaboration with USAID and DFID, specific outcome indicators to measure progress in relation to the implementation of the major interventions.

To facilitate country/district data analysis and reporting, computers and linked equipment were made available for National Malaria Control Programmes in selected countries, as well as modems and software to establish internet/e-mail connectivity. Health workers, at central and district levels, have been trained in data management.

In addition to training in disease management, peripheral health workers in epidemic-prone districts have been trained to recognise and quickly report malaria epidemics, as part of the preparedness Plan of Action.

Tools and indicators have been developed and used to monitor the implementation status of control activities, in particular the progress made in the management of uncomplicated and severe malaria.

Inter-country workshops have emphasised the use of standardised epidemiological indicators based on agreed malaria case definitions. Consultants (16 at Lomé and 17 at Addis Ababa) have been trained in the development and use of "monitoring forms", which have been extensively used during various country reviews.

Various KAP (Knowledge, Attitude, Practice) studies have been carried out as part of situation analysis and monitoring activities, specially regarding the use of ITMs and treatment-seeking behaviour at community level.

2.2.2.7 OPERATIONAL RESEARCH

Operational research activities are an important part of malaria control since, when properly selected, they can help solve field problems met during the implementation of interventions. The AIMC, as part of institutional strengthening, has encouraged National Malaria Control Programme managers to identify problems appearing during the implementation process and to develop relevant field research activities, thus improving collaboration and coordination with national research institutions.

In order to update their antimalarial drug policies, therapeutic efficacy studies have been initiated in 30 countries using a WHO standardised protocol. WHO has also provided financial and technical assistance to support the following operational studies in 1997:

- KAP studies on the use of ITMs, prior and after promotional and supportive activities; and
- Studies of the management of severe malaria in district hospitals, including an assessment of case fatality rates (CFR).

The 1998 project included support to operational research as a priority activity. A workshop was conducted in Banjul and provisions were made in country allocations for an operational research

fund of at least US$ 10,000 per country. Countries were encouraged to set up a research agenda in collaboration with research institutions and plan for operational research projects, relevant to the solution of field problems. As a result, the following research projects have been advanced with AIMC support in 1998:

- A study on practical ways of improving the management of severe malaria cases under field conditions, including the use of loading dose of quinine and the use of suppositories;
- A study of the frequency and severity of chloroquine-induced pruritus;
- KAP studies on the use of bednets and impregnated materials;
- A study on the potential for decreasing severe malaria by improving the management of uncomplicated malaria at the periphery; and
- A multicentre study on management of severe malaria in selected district hospitals.

An important objective of this project activity was to overcome the well-recognised lack of coordination between Malaria Control Programmes and research institutions. Nevertheless, a solution to this problem will require constant and coordinated effort over a long period of time.

2.2.3. PROJECT SUPPORT TO COUNTRIES

2.2.3.1 TECHNICAL SUPPORT

In order to provide accelerated support and cover the demands from countries it was necessary to strengthen the response capability of the WHO regional offices. With the collaboration of partners, particularly USAID and DFID, this was accomplished by reinforcing human resources at the regional offices and, in the African Region, by the establishment of inter-country teams and the recruitment of National Programme Officers, as mentioned above under general management.

Direct technical support to countries was provided by normal WHO procedures. It included:

- country visits;
- recruitment of national and international consultants;
- development of regional technical guidelines;
- translation and dissemination of technical documents and training materials; and
- follow-up support.

2.2.3.2 LOGISTIC SUPPORT

The project also provided essential supplies, such as:

- vehicles for supervision and monitoring;
- desktop and laptop computers, printers and photocopiers to facilitate communication, monitoring, evaluation and training;
- standard quality drugs for testing therapeutic efficacy;
- laboratory materials for training, including microscopes for parasitological diagnosis and binocular dissecting microscopes for entomology;
- internet, or at least e-mail, linkage systems; and
- drugs for severe malaria as part of a training package to set up appropriate case management.

2.2.3.3. FINANCIAL RESOURCES FLOW

The special nature of the project required a rapid and carefully monitored flow of resources from WHO headquarters to regional offices, WHO country representatives, Ministries of Health and country programmes and within countries, including a direct flow of appropriate information. Each activity in turn was carefully monitored to match evaluation and use of funds (see Activity Tracking Systems (ATS) below 2.3.3).

Disbursement of funds for AFRO countries was made in five different instalments: US$ 3 million

in March 1997, US$ 4 million in August 1997, US$ 2 million in November 1997, US$ 5 million in May 1998 and US$ 4 million in October 1998. The US$ 2 million for EMRO countries was disbursed in two instalments (April 1997 and May 1998).

2.3. PROJECT MONITORING AND EVALUATION

The AIMC included an evaluation process at the planning stage as an integral part. This consisted of following-up the planned activities in each country in relation to its Plan of Action and the local situation. Based on that evaluation WHO has recommended an adjustment of activities and budget, such as their addition or decrease, based on the level of progress achieved. Demonstrated progress also served as a basis for re-planning the continuation and/or extension of the project.

Monitoring included: a) an activity tracking system (ATS software), enabling WHO to continuously track the detailed activities contained in each Plan of Action, and b) periodical reports on the status of implementation of the planned activities.

The monitoring of the accelerated project may be considered as a model and future resource for other African countries struggling with the prevention and control of malaria, and for the WHO Roll Back Malaria Cabinet Project.

2.3.1. INTER-COUNTRY MEETINGS

The evaluation process of the level of implementation was initiated during the second half of 1997, by organising:

- An inter-country meeting in Windhoek in August 1997, to discuss with country representatives the status of implementation of the various activities, exchange experiences, and address the constraints encountered. Representatives from all 21 AFRO countries, plus Somalia, attended this meeting at which it was recommended that a mid-term review should be organised at country level.
- Two workshops to prepare country reviews, one in Lomé for French-speaking countries, and another in Addis Ababa for English-speaking countries. They defined the tools and criteria to be utilised in the mid-term reviews, and for orientation of the countries on correct implementation, reviewing and reporting procedures. Twenty-nine consultants from various disciplines were invited to the workshops to: a) become acquainted with country Plans of Action and the proposed indicators; b) discuss the modalities of monitoring and evaluation, and c) discuss the tools and mechanisms developed for the project review.

These workshops selected the process and result indicators to be used for evaluation, and elaborated the following pre-coded questionnaires/sheets for monitoring and evaluation:

- Standardised format for country progress reporting;
- Observation checklist for out-patient care;
- Observation checklist for in-patient care;
- Observation checklist for pharmacy records;
- Observation checklist for laboratory diagnosis;
- Checklist for exit interview with mother/care-taker;
- Morbidity and mortality forms for reviewing in- and out-patients' records in health care facilities;
- Community health survey questionnaires to assess the recognition and management of cases at village level (shopkeepers, community health workers, birth attendants, etc.); and
- Community health survey questionnaires to assess the status of implementation of insecticide-treated materials.

These tools (questionnaires and observation checklist) were aimed at monitoring the practice of health services as well as practices at community level, mainly in the management of malaria, measuring progress (in quantity and quality) by outcome indicators, following appropriate training. This system can be adapted to the monitoring of clinical practice in general.

2.3.2. COUNTRY REVIEWS

The review process included: a) review of the activities that were part of the Plans of Action; b) the assessment of their level of implementation (activities and funds); c) review of the activities implemented with other sources than the ones coming from AIMC; d) identification of problems and constraints, and e) organisation of field visits to health facilities at all levels.

Reviews were carried out in the various countries using prepared questionnaires, interviews, and checking the availability of supplies and equipment (see 2.3.1). They were carried out by teams of 3-4 consultants (epidemiologist, paediatrician, entomologist/parasitologist) joined by a national team of 3-9 professionals pooled from the malaria control programme and other institutions as well as an epidemiologist from the WHO country office. The teams had the following terms of reference:

- To assess implementation progress of planned activities and evaluate project outcomes using tools developed by WHO;
- To identify problems and constraints that impede project implementation;
- To recommend possible solutions; and
- To submit assessment reports to WHO and MOH.

Three Interim Reports were issued, documents AFRO/EMRO/CTD/MAL/ 97.13, 97.18 and 98.1, as well as a Status Report (March 1998), document CTD/MAL/AFRO/EMRO/98.5

The first-year reviews were analysed during two meetings, one in Khartoum (for EMRO members) from 15 to 28 November 1997, and another in Kampala (for AFRO members) from 16 to 21 December 1997. These analyses were the basis for the project's extension to 1998 and guided the preparation of Plans of Action for that extension.

In September-October 1998, a second evaluation, using the same methodology and evaluation tools as in 1997, was undertaken in 11 countries, selected at random. A comparative analysis of the achievements of the two evaluations, as well as a critical review of the methodology and tools, was undertaken by a consultant in early 1999.

2.3.3. IMPLEMENTATION STATUS FORM AND ACTIVITY TRACKING SYSTEM (ATS)

A special form was developed for reporting by countries on the status of implementation of detailed planned activities, funds spent against budget planned, dates and responsible officer. Countries were also encouraged to report on activities carried out under other agencies' funds.

AIMC developed a computer-based evaluation system (ATS) to follow up the implementation process of each activity, the problems encountered and solutions adopted, as well as any re-planning required.

This system keeps a record, on a relational database (Microsoft ACCESS), of all activities implemented under the project in 1997 and 1998. It includes all the information reported on the "implementation status form" plus the Plans of Action and reports sent by countries.

The system was designed to allow up-to-date monitoring and evaluation of the flow of activities, tracking the implementation rate of activities and related funds spent.

Part 3.

Major achievements

3.1. COMMUNITY, NATIONAL, REGIONAL AND INTERNATIONAL POLITICAL COMMITMENT

ALL SELECTED countries showed strong political commitment to malaria control but still lacked resources, both human and material. In fact AIMC itself had been the result of the political will of African countries, which motivated the review of the Global Malaria Control Strategy by the Economic and Social Council of the UN (ECOSOC), and the WHO Assembly resolution of 1996. The feasibility demonstrated by AIMC strengthened that political commitment.

The project has created a momentum and interest from governments and the international community, leading to:

- The Harare Declaration on malaria by the OAU in 1997.
- The African Initiative for malaria control in the 21st century.
- The increased support provided by development, multi- and bilateral agencies and NGOs (sometimes through common basket). These include ACED, ADB, AIMI, AMI, AUSAID, BASIC, Belgian Cooperation, DFID, Dutch Cooperation, EAN, EU, French Cooperation, GTZ, IDRC, Institute of Portugal, Italian Cooperation, JICA, MRC/UK, MSF, NIH/US, Pasteur Institute, PSI, SADC, SCF, SIDA, South Africa, Spanish Cooperation, Swiss Cooperation, UNICEF, USAID, Wellcome Foundation and WB.
- The commitment for supporting malaria control, as an essential part of a global programme for the control of parasitic and infectious diseases, by the G8 Summit in Birmingham in 1998.

The project also increased awareness among community leaders and communities on methods of protection and control.

3.2. INSTITUTIONAL STRENGTHENING

The first priority of AIMC was to develop or strengthen country capacity for implementing the strategy for malaria control. Most of the project's activities have been executed by the general health services and the affected communities with the technical support and guidance of a technical core in the Ministry of Health. In order to conduct the necessary operational research to solve problems, efforts have been made and steps taken to improve the required support for malaria control from research institutions. In order to achieve the required coordination of all these partners, most countries opted for:

- The establishment of an Advisory or Technical Committee to support the Malaria Control Programmes;
- The recruitment by WHO of National Consultants (or Programme Officers) to strengthen programme capabilities;
- The formulation or updating of national policies for malaria control;
- The formulation or updating of an antimalarial drug policy and the setting up of mechanisms for its revision and updating;
- The establishment, in collaboration with the Essential Drug Programme in WHO, of a system of supply to ensure availability and affordable prices for essential drugs, which may develop to include some mechanism to provide for the poverty-stricken.
- The development of mechanisms for epidemic forecasting and prevention and/or early detection and control.

Particularly important has been the generation of a collective conscience of evaluation, as a base for planning future action, as well as the strengthening of the critical ability of programmes to recognise and address problems.

In order to maintain support for the strengthening of national technical capacities, AIMC has strengthened the malaria team at AFRO and EMRO and has appointed a malaria expert in each of the five sub-regional epidemiological divisions (Harare, Kampala, Libreville, Lomé and Dakar).

3.3. PROGRAMME INTEGRATION

The AIMC project strengthened working relations between WHO, the National Programme managers and the Ministries of Health, establishing closer collaboration and trust. It also strengthened the intra- and intersectoral collaboration and coordination of the various partners in malaria control.

The involvement of leading health professionals and heads of paediatric departments in training and formative supervision has considerably increased the public health vision of clinicians, making them full participants, not just occasional collaborators with the project. These activities have made an important contribution to breaking barriers between public health and medical professionals.

Thanks to their involvement in programme reviews, clinicians have started to see the usefulness of epidemiological information and have become interested in clinical epidemiology and in improving their collaboration with the National Malaria Control Programme. Malaria Control Programme managers and collaborating clinicians are also becoming interested in the problems of health coverage and access and their possible relation with efforts to improve only quality of service, particularly by questioning the possible negative effects of the universal "payment for services" component of the Bamako Initiative. Some serious effects may be: a) the lack of accessibility to adequate care to a number of the poorest sectors of the population, and b) the delay in seeking treatment by an important fraction of the population.

3.4. CAPACITY BUILDING

The overall capacity of the health services has been considerably strengthened for the implementation of the control strategy's basic elements. The basis for this capacity building has been the implementation at country level of cascade training of health services staff in all selected districts and the development, production and circulation of technical guidelines.

It should be recognised that although the project was successful in strengthening the technical capacity of the health services to manage the malaria problem, its impact on institutional development was limited.

3.4.1. PROJECT MANAGEMENT

The preparation of detailed Plans of Action for the implementation of a clearly defined policy within a fixed budget constituted a training exercise for many programmes which, in the past, often prepared rather idealistic plans aimed at seeking out external funds which seldom materialised. The plans took into account the collaboration of all partners, aiming at the elaboration of joint Plans of Action (e.g. Uganda and Benin). It particularly supported links with other relevant programmes, particularly with new initiatives such as IMCI (see 2.2.2.2, page 20). Even if joint planning was not achieved in its two years, the AIMC project advocated and pushed ahead collaboration with partners in execution.

An important element of the project was the introduction of programme management monitoring. A system of internal and external monitoring of the implementation of the project was developed, in order to establish rational procedures for re-planning and evaluation. This considerably improved the capacity for problem identification and the formulation of operational research needs.

This system of monitoring and evaluation allowed the project to evolve from the rather standardised framework of the first year to the more flexible, country-driven programme of 1998, which was based on a more complete evaluation of countries' needs.

The project established coordinating mechanisms, such as National Committees and the recruitment of national malaria consultants to address technical and administrative matters and to facilitate links with other programmes.

WHO provided computers, modems and software as well as Internet connectivity to facilitate communications between national programmes and WHO.

3.4.2. DISEASE MANAGEMENT

The AIMC project supported the active involvement of clinicians and paediatricians in the training and guidance of case management by peripheral health units. This not only improved the quality of care but also broadened the public health approach of medical professionals. It also promoted the inclusion of a public health vision into medical school training. In particular it ensured that:

- Managers of Malaria Control Programmes acquired experience in the planning, re-planning and implementation of large-scale malaria control activities, involving several districts;
- Over 23,000 health workers were trained with particular emphasis on case management;
- Through training and operational support capacity was developed in 30 countries for the assessment of the therapeutic efficacy of antimalarial drugs;
- The rational use of antimalarials by clinicians and nurses in health care facilities was improved in accordance with national guidelines;
- Links were strengthened with IMCI approaches to the management of childhood illness;
- Laboratory diagnosis was improved; and
- Drug efficacy was monitored and the results used to update antimalarial drug policies.

3.4.3. VECTOR CONTROL

An essential element of the AIMC strategy is the implementation of selective transmission control. In most countries this takes the form of promoting and supporting the use of insecticide-impregnated bednets or other materials. In order to facilitate their introduction or development and achieve large-scale implementation the following activities were carried out in some countries:

- Training in the use of insecticide-impregnated materials and the establishment of impregnation centres, in several countries.
- Over 4,200 health workers were trained in bednet impregnation and the management of supplies and impregnation centres.
- Health information and education to promote and support their use.
- Formulation of a plan of action for the large-scale use of ITMs and for monitoring and evaluating their use.

The project also supported the improvement of residual insecticide spraying:

- In countries with large areas using traditional vector control measures (e.g. Ethiopia, Southern Africa), by improving the selective application and quality of spraying in selected areas.
- In epidemic-prone areas, by concentrating on the logistics of rapid mobilisation of trained personnel, equipment and supplies.
- In all areas likely to need insecticides for vector control, by supporting monitoring of insecticide susceptibility.

3.4.4. COMMUNITY-BASED ACTIVITIES

The main objective of strengthening malaria control programmes and the improving case management at all levels of the health services was to achieve early diagnosis and prompt treatment for all malaria cases. This recognises that, under prevailing conditions in most of rural Africa, more than three-quarters of malaria cases are managed at home. Therefore AIMC, as part of the broadening of the public health approach of medical care, strengthened the role of established health services in the promotion and support of the management of fevers at community level.

As an important component of malaria control at the periphery the project supported the training of community volunteers in the management of uncomplicated malaria and in the early recognition of signs of severity requiring immediate referral to health centre or hospital care. It also supported supervision and support activities carried out by health centre personnel.

The project also encouraged and supported coordination with NGOs in specific community-based activities, especially the manufacture, distribution and impregnation of bednets.

IEC activities focussed on improving home and community care of fevers, adequate use of health services, recognition and reporting of abnormal situations, and collaboration with vector control activities when required.

3.4.5. EPIDEMIC PREVENTION AND CONTROL

Countries with epidemic-prone areas were supported to develop guidelines for the forecasting or early detection of epidemic outbreaks.

Training in epidemic recognition, reporting, assessment and control was conducted at inter-country and national levels.

Inter-country workshops were conducted for East and Southern Africa in Durban, and for the Eastern Mediterranean countries in Khartoum. These workshops were followed in some countries by national workshops involving district medical officers.

AIMC also supported the Southern Africa Malaria Control team in Harare in developing coordinated inter-country epidemiological information mechanisms. These are aimed at the early detection of epidemics as well as the identification of indicators of increased risk which can be used for epidemic forecasting.

WHO/AFRO supported the establishment of stocks of second-line antimalarial drugs as well as drugs and other supplies for the management of severe malaria, in Dakar, Kampala and Harare, to serve as revolving stocks to be used in emergencies.

3.4.6. STRENGTHENING HEALTH INFORMATION SYSTEMS

A major achievement of the project has been the recognition by most antimalarial programmes of the importance of health information systems and the need for their strengthening, in order to guide the general performance, as well as the evaluation and eventual re-planning of control activities. In particular:

- Strengthening the use of epidemiological information (case definition, notification and feedback), which in many countries was very weak, as a basis for planning, as well as for the identification of epidemic-prone areas and the early detection of epidemic outbreaks.
- Monitoring potential problems such as changes in human ecology or in vector susceptibility to insecticides.
- Monitoring of health services practices and programme evaluation.
- Reviewing of reporting systems and epidemiological indicators and case definitions, aiming at the selection and standardisation of relevant indicators.
- Strengthening communication systems within and between countries.

3.4.7. INFORMATION, EDUCATION AND COMMUNICATION

National programmes were encouraged and supported to use the media as well as all existing forms of information and education, such as TV, radio, posters and information bulletins, to achieve:

- advocacy of the programme;
- political awareness of the human and socio-economic burden of malaria;
- communication with communities in rural areas; and
- collaboration of other partners.

Many countries emphasised their commitment to IEC by devoting special national malaria days or weeks for coordinated information and education activities involving national, provincial, district and local authorities.

Part 4.
Challenges

The project for AIMC in selected African countries was jointly supported by WHO (HQ jointly with AFRO and EMRO) and significantly contributed to increase the capacity of endemic countries to control malaria. As a foundation for future actions, the project has contributed to identify, to some extent, important technical and managerial constraints which should be better addressed by all partners interested in health sector development. Important issues are listed below:

4.1. PROGRAMME MANAGEMENT

- Absence, in most countries, of national plans for malaria control integrated with other health programmes with the support of interested partners.
- Shortage of technical staff at country, and particularly at district level.
- Lack of recognition by Ministries of Health of the need to continue strengthening the national capacities, especially within the context of the decentralised health sector reforms.
- Inadequate links between central and district levels in planning and implementation. Progress reports are not routinely made and, when made, have only limited feedback.
- Decentralised activities not yet well planned and supported by the central level.
- Weakness in coordination, monitoring and supervision at country level. National Steering Committees are not yet established or not yet properly functioning in several countries.
- Difficulties in establishing comprehensive POAs with other programmes and partners leading to overlap/duplication/fragmentation, or even competition, among partners at district level.
- Limited capacity of WHO country offices to fully contribute to the AIMC project.
- Inadequate supervision, particularly in following-up and evaluating the outcome of training activities. This is generally due to staff shortages and lack of mobility.

4.2. DISEASE MANAGEMENT

- Shortage of drugs in health care facilities, as well as equipment and materials in referral hospitals, especially in those countries undergoing health sector reforms. About 60% of health facilities mentioned shortage of drugs during programme reviews.
- Counselling to mothers/caretakers was a persistent weakness in malaria case management.
- Very insufficient laboratory facilities and inadequate capacity.

4.3. VECTOR CONTROL

- Inadequate appreciation of the relevance of vector control.
- Persistence of traditional approaches, and resistance to introduce selective transmission control based on epidemiological information.
- Inadequate information systems leading to late recognition of situations requiring emergency vector control, and eventually to serious logistic problems.
- High cost of insecticide-treated materials, inadequate availability and lack of recognition of the importance of re-impregnation.
- Delay in obtaining bednets and insecticides timely, i.e. before the transmission season.

4.4. COMMUNITY-BASED ACTIVITIES

- Insufficient involvement of communities in decision-making according to their local needs and wishes. Most decisions affecting community life are still imposed from the outside.

- Inadequacy and weakness of appropriate mechanisms to deliver education messages to rural communities.

4.5. EPIDEMIC PREVENTION AND CONTROL

- Weak capacity for epidemic surveillance and data management at all levels of the health services.
- Inadequate identification and characterisation of epidemic-prone areas.
- Lack of intersectoral collaboration, especially (i) regarding development projects that may lead to environmental modifications, and (ii) with the meteorological services in countries with malaria epidemics related to weather patterns.

4.6. HEALTH INFORMATION SYSTEMS

- Inadequate selection and standardisation of epidemiological indicators and case definitions.
- Irregular collection and reporting of data with limited analysis.
- Limited feedback to those generating data.

4.7. INFORMATION AND COMMUNICATION

- Lack of expertise in social mobilisation and marketing.
- Weakness or non-existence of IEC services.
- Inadequate number and poor distribution of IEC materials.
- Standardised mechanism to capture data at community level not developed.

4.8. OPERATIONAL RESEARCH

- Inadequate collaboration between National Malaria Control Programmes and research institutions in applied research.
- Capacity of National Programmes for undertaking operational research activities is still weak. Such activities are often undertaken by research institutions with poor collaboration/links with national programmes and with little consideration for programme needs.
- Other than therapeutic efficacy and some KAP studies, very few operational research activities were undertaken by control programmes.

4.9 POTENTIAL PROBLEMS OF COST RECOVERY MECHANISMS

It has been a common observation that the cost of malaria treatment remains a serious problem and the need to find the required money may constitute an important cause for delays in starting treatment. For example, in Burkina Faso, it has been estimated that the cost of rational treatment, using generic drugs, of a severe case (even without hospitalisation or indirect costs of transport, etc) amounts to 7,000 CFA (US$ 14), while 40% of the population has an income of less than 40,000 CFA (US$ 80) per annum. The average cost of the treatment of a severe case of malaria in the Central Hospital in Ouagadougou has been estimated at a minimum of 21,000 CFA, since most hospital staff prescribe pharmaceutical specialities. Hospital charges, which start at a minimum is 300 CFA/day and can rise to 3,000/day or more, must be added to these costs.

Even the cost of treating uncomplicated malaria at a health centre or a dispensary may represent a significant burden for many families, since at a minimum it amounts to 100 CFA for the consultation, about 500 for drugs (chloroquine and paracetamol), while a blood film costs 400-750 CFA. Although an emergency fund was established in Burkina Faso in 1994, at the beginning of the implementation of the Bamako Initiative, it was soon discontinued because of great difficulties in administration, which rendered it ineffective.

In Togo, AIMC has expressed concern about an apparent increase, in the last years, in hospital malaria mortality. There are plans to study this, first to ascertain whether it is a real phenomenon or a statistical artefact and, if the former, to investigate its possible causes. A common hypothesis has been to attribute such an increase to the impact of chloroquine resistance, but it will also be necessary to investigate the possible impact of charging for all services in causing delays to initiate

treatment. It is a common observation of all health providers, from hospital paediatric services to health centres and dispensaries, that the need to find the money to pay is a frequent cause of delay in bringing children to hospital and initiating treatment.

It would be a sad paradox if the cost-recovery mechanisms, which have undoubtedly contributed to the improvement of the quality of medical care practices in health institutions, have also contributed to an increase in mortality from a highly prevalent disease such as malaria.

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Annex

Development of malaria control in tropical Africa

1. *The Global Malaria Eradication Campaign in Africa*

Before independence, the main objective of malaria control, in most countries of Africa south of the Sahara, was the protection of the colonial enterprise. Nevertheless, in pursuing these limited objectives colonial powers realised that in tropical Africa malaria was a much stronger obstacle to colonisation than anywhere else in the world. Since the beginning of the century there have therefore been great incentives to test new approaches to control in Africa, e.g. Ross' project in Freetown, Wellcome's project in Khartoum. Although these tests had very limited success they motivated an interest in the study of epidemiology and epidemic risk. Regarding control, most countries concentrated on ensuring accessibility to quinine treatment, promoting the prophylactic use of quinine and, eventually, instituting vector control in towns or projects of economic importance.

The introduction of DDT did not change the main policy orientation. Since its creation WHO has been aware of the humanitarian and economic importance of controlling malaria in Africa, and has supported pilot projects using the latest approaches, in particular the use of DDT spraying.

The 1957 launch of the Global Malaria Eradication Campaign, in spite of a statement to the contrary made by the Secretariat in the World Health Assembly, did not include tropical Africa. The 6th report of the WHO Expert Committee (1956) recognised that "the problem of finding an effective and economical method of eradicating malaria in tropical Africa has not yet been solved", that this may be due to the "peculiarity of the habits of *A. gambiae*, the very long transmission season and the extremely high endemicity, complicated with restrictions of communications and the low level of development of administration". It added that "indeed, these physical handicaps are likely to form an effective barrier to a large-scale eradication programme in this area and perhaps in other countries with comparable conditions". At this particular time the Expert Committee recommended "increased emphasis and assistance" to pilot projects in Africa, including combinations of residual spraying and chemotherapy.

In view of this recommendation, WHO continued to support pilot projects and field research to find cost-effective methods of addressing the problem of malaria control in rural tropical Africa.

The success of pilot projects in forest (Southern Cameroon and Liberia) and in medium-altitude (South West Uganda) areas, and the partial success in some other projects (e.g. Rwanda, Togo), was compromised by an inability to interrupt transmission in the lowland savannah (Northern Cameroon, Ghana, North West Nigeria, Tanzania) and the difficulties of coverage, and eventually the lack of success, of programmes aimed at country-wide eradication (e.g. Ethiopia, Zanzibar, Zimbabwe). These results supported the conservative view that control in tropical Africa should continue to concentrate on towns and projects of economic importance. Proposals for sub-regional eradication did not attract financial support.

Meanwhile, the progress of eradication programmes outside tropical Africa was hampered by difficulties of maintaining interruption of transmission in the absence of a reasonable coverage by functioning health services.

It was concluded that the consolidation phase of the eradication campaign required the collaboration, and therefore the existence, of a rural health infrastructure. The 8th Expert Committee (WHO, 1961) recommended that countries lacking an adequate health infrastructure should, before engaging in an eradication campaign, plan for "a parallel correlated development of rural health services to assure the effective implementation of the consolidation and maintenance phases of the future malaria eradication programmes". This proposal was the basis for the pre-eradication programmes in Africa, which were supported by the Executive Board and the Health Assembly in repeated resolutions after 1962.

It was considered that pre-eradication programmes could provide the waiting period required to solve the technical problems of malaria eradication in the African savannah. All African countries were therefore encouraged to adopt pre-eradication programmes, even if some of them had better functioning rural health services than many countries in the Americas or Asia. These programmes required the development of rural health services to conform to the needs of a future malaria eradication programme. The development of health services in rural areas continued to respond to the perceptions of immediate needs and opportunities by people and the authorities, so that the implementation of the pre-eradication programmes was never fully realised.

In the meantime, the stagnation of the Global Malaria Eradication Campaign during the late 1960s led the World Health Assembly to accept that malaria eradication was not feasible in many countries with the technical and material resources available. Therefore, these countries were encouraged to embark on malaria control programmes adapted to their local conditions. The WHA insisted that the final objective of control was the eradication of the disease, but lifted the time constraints imposed by the previous campaign approach. Unfortunately the lifting of the time target resulted in withdrawal of very important financial support at a time when the oil crisis was seriously increasing the cost of insecticides and other materials.

For Africa this period meant the final abandonment of the pre-eradication projects which, although not seriously implemented, maintained an interest in the study of the malaria problem in the countries and some capacity to address at least acute problems. WHO concentrated its efforts in supporting the Garki project to study the epidemiology of malaria in the dry savannah of West Africa, developing and testing a mathematical model of malaria epidemiology, and testing the possibility of controlling malaria with a combination of mass drug distribution and indoor residual spraying.

The relative apathy of the early 1970s and the hope that malaria control could wait for the development of the "basic health services", was shaken by serious epidemics in 1976-1977, which most dramatically affected the Indian subcontinent and SE Turkey, bringing the dangers of neglecting malaria control to the attention of the world.

At the same time African countries voiced their dissatisfaction with 20 years of research, which had without doubt contributed to the improvement of the global armamentarium for malaria control, but had not improved their capability of managing their problem. WHO was asked to develop a global control strategy, which should incorporate practical propositions for action in tropical Africa.

The formulation during the mid-1970s of the primary health care strategy for the development of a health infrastructure guided the elaboration of the malaria control strategy which was adopted by the 31st World Health Assembly in 1978 (WHO, 1978). The strategy's basic objectives were: a) the reduction in mortality and in the negative social and economic effects of the disease, b) the prevention and control of epidemics, and c) the protection of malaria-free areas with the ultimate objective of eradicating the disease whenever feasible. The first two objectives could be directly applied to tropical Africa. The strategy postulated that the selection of control methods should be made based on what was defined as the "epidemiological approach", i.e. taking into fullest possible consideration the biological, ecological, social and economic determinants of the malaria problem, and those factors which might influence the applicability or effectiveness of individual control measures and their possible combinations.

Many of the same problems that hampered the transformation of eradication into control programmes, in Asia and the Americas, and the setting-up of control programmes in Africa, continued to prevent the 1978 WHO malaria control strategy from being implemented throughout the 1980s. This led WHO to call a Ministerial Conference on Malaria Control in Amsterdam in October 1992. The conference was preceded by three Interregional Meetings on Malaria, for Africa (October 1991), for Asia and the Western Pacific (February 1992) and for the Americas (April 1992). The interregional meetings reviewed the situation in their regions, updated their antimalarial strategies and contributed to the formulation of a revised malaria control strategy which was presented, refined and adopted by the Amsterdam Conference.

2. *The Global Malaria Control Strategy (GMCS)*

The strategy adopted at the Amsterdam Conference (WHO, 1993a) stresses the paramount importance of responding to the needs of the people living in malarious areas by making adequate

case management accessible, both physically and culturally, to all populations. This is considered a necessary requisite for the build-up and the sustainability of other measures aimed at the prevention of infection.

The strategy rests on four basic elements:

- To provide early diagnosis and prompt treatment;
- To plan and implement selective and sustainable preventive measures, including vector control;
- To detect early, contain or prevent epidemics; and
- To strengthen local capacities in basic and applied research to permit and promote the regular assessment of a country's malaria situation, in particular the ecological, social and economic determinants of the disease.

It recognises that the effective implementation requires:

- Sustained political commitment from all levels and sectors of government;
- Malaria control to be an integral part of health systems, and to be coordinated with relevant development programmes in non-health sectors;
- Communities to be full partners in malaria control activities; and
- Mobilisation of adequate human and financial resources.

In summary, "the Global Strategy calls for rational use of existing and future tools to control malaria. It recognises that malaria problems vary enormously from epidemiological, ecological, social and operational viewpoints, and that sustainable, cost-effective control must therefore be based on local analysis. Based on decades of lessons from practice, the Strategy is firmly rooted in the primary health care approach, and calls for the strengthening of local and national capabilities for disease control, for community partnership and the decentralisation of decision-making, for the integration of malaria control activities with related disease programmes, and for the involvement of other sectors, especially those concerned with education, agriculture, social development and the environment. It emphasises the vital importance of continuing malaria research, locally and internationally, and of international teamwork in both control and research" (WHO, 1993a).

The GMCS strategy stresses the indisputable advantage of sustainable, even if slow, progress over spectacular but ephemeral success. Its main goals concern problems that are not only important, but manageable. It recognises that malaria control is an essential part of health development and, as such, has to contribute to the health system as well as make use of it.

The objective of control is to prevent mortality and reduce morbidity and social and economic loss, through the progressive improvement and strengthening of local national capabilities. It is recognised that there is no single technical formula applicable to all situations and that, therefore, interventions should be adapted to local conditions, the key to which is "competent local action" (WHO, 1993b).

From the point of view of malaria control, the existence of two main categories of malarious countries is recognised:

- those, mainly in tropical Africa, which were not included in the Global Eradication Campaign of the 1960s and which therefore never established an antimalarial programme that included all their malarious areas; and
- those included in the eradication campaign, which had implemented large-scale programmes of vector control, based on indoor insecticide-spraying, and surveillance, based on case detection.

Most countries in tropical Africa, falling into the first category, should establish realistic malaria control programmes that address the basic elements of the strategy. Control, therefore, should concentrate on improving diagnosis and treatment facilities and ensuring their physical, financial and cultural accessibility to all the people. The facilities should be supported by health information and education (IEC) of the population, and an epidemiological information system to promote, guide and support the use of personal and community protection measures in harmony with the socio-economic development of the communities. Many countries have been exploring ways of making pyrethroid-impregnated bednets accessible to people in endemic areas but impregnated bednets are still far from being a widely applicable control measure.

It seems obvious that, in accordance with the Global Malaria Control Strategy, transmission control in Africa must be considered as complementary to, or as a spearhead of, the development of a health infrastructure, and that countries should avoid embarking on programmes which are dependent on external funding. When available, such funding should be used to develop local capabilities to identify and solve problems, to strengthen the health infrastructure needed for the application of available control methods, and to develop and implement new methods.

It should not be forgotten that the Afrotropical region is dramatically characterised by the most powerful malaria vector system in the world, which maintains the extreme dominance of *P. falciparum* infection in holoendemic or hyperendemic conditions, except where undisturbed primary forest, high altitude or desert conditions limit the development of the *A. gambiae* complex/*A. funestus* vector system. In addition, man-made environmental disturbances, such as agricultural development and deforestation, extension of irrigation in arid areas and desalinisation of coastal areas favour the progressive extension of the endemicity beyond its present limits, while climatic change may also contribute to its further expansion and anarchic urbanisation may also create foci of increased transmission in areas of high population density. Therefore, the development of practical methods of transmission control in holoendemic areas of Africa should remain a global research priority.

The revised Global Malaria Control Strategy adopted by the Ministers of Health meeting in Amsterdam was endorsed by the World Health Assembly in 1993, reviewed by the Economic and Social Council of the United Nations and endorsed by the UN General Assembly in 1994 (Resolution 49/135: UN, 1994).

WHO has concentrated its efforts in the development of human resources at all levels of the health services and the development of appropriate linkages and participation of communities. In addition, WHO has placed specific priority on the development of national antimalarial drug policies and the monitoring of the therapeutic efficacy of antimalarial drugs, developing standard protocols, organising intercountry training courses, supporting national workshops and courses, and collaborating in surveys, the organisation of monitoring activities and the review and interchange of experiences and information.

Economic realities suggest that many endemic countries will continue to require external support but, in many instances, there is a need to improve the cooperation between all agencies, international, bilateral and NGOs, interested in malaria control and also to search for new partners. Existing regional and country Plans of Work emphasise the normative function of WHO, aiming at ensuring the best possible quality of technical support to countries. There persist, nevertheless, numerous problems of organisation and functioning of services, manpower development and maintenance, coverage and penetration to the periphery, sustainability, intersectoral cooperation and coordination. It is felt that:

- the best guidelines and technical advice would be ineffective, without improving programmes' ability to overcome the operational problems which hamper implementation and penetration to the periphery;
- WHO, with its capacity for regional and global overview, has an essential contribution to make to that improvement, by consolidating, validating and disseminating countries' experiences, provided it is given the appropriate means for the task.

WHO convened a Study Group on the Implementation of the Global Plan of Action for Malaria Control 1993-2000 (WHO, 1993b) and a Study Group on Selective Vector Control (WHO, 1995) to provide technical guidance on implementing the strategy. WHO and the World Bank have also organised a consultation to explore the political, managerial and financial problems that antimalarial programmes were experiencing in different parts of the world in putting the Global Malaria Control Strategy into effect (WHO/World Bank, 1995).

In 1997 WHO embarked on the AIMC in Africa as a response to the WHA Resolution 49.1 and in 1998, the Roll Back Malaria movment was launched in partnership with the World Bank, UNDP and UNICEF with the aim of halving the world's malaria burden by 2010 compared to 2000.

Acronyms used in this report

ADB	African Development Bank
AFRO	WHO Regional Office for Africa
AIMC	Accelerated Implementation of Malaria Control
AMREF	African Medical and Research Foundation
ARI	Acute Respiratory Infection
ATS	Activity tracking system
CDD	Control of Diarrhoeal Diseases
CDS	Communicable Diseases
CFR	Case Fatality Rate
CTD	Division of Control of Tropical Diseases (1990-98)
DANIDA	Danish International Development Assistance
DFID	Department for International Development
EANMAT	East African Network for Monitoring Anti-malarial Treatment
ECA	Economic Commission for Africa
ECHO	European Community Humanitarian Office
EMRO	WHO Regional Office for the Eastern Mediterranean Region
GTZ	Deutsche Gesellschaft für Technische Zusammenarbeit
HIS/HIMS	Health Information (Management) System
HIV/AIDS	Human Immuno-deficiency Virus/Acquired Immuno Deficiency Syndrome
IDA	International Development Association
IEC	Information Education and Communication
IFRC	International Federation of Red Cross and Red Crescent Societies
IMCI	Integrated Management of Childhood Illness
IMR	Infant Mortality Rate
ITMs	Insecticide Treated Materials
KAP	Knowledge, Attitude, Practice
MAL	Malaria Unit, within CTD
MOH	Ministry of Health
MOPH	Ministry of Public Health
NGOs	Non-Governmental Organisations
NMCP	National Malaria Control Programme
NORAD	Norwegian Agency for Development Cooperation
OAU	Organisation for African Unity
POA	Plan of Action
PSI	Population Services International
RBM	Roll Back Malaria
SP	Sulfadoxine-pyrimethamine
SSP	Soins de Santé Primaire
TDR	UNDP/WB/WHO Special Programme for Research and Training in Tropical Diseases
TOT	Training of Trainers
UN	United Nations
UNDP	United Nations Development Programme
UNESCO	United Nations Educational, Scientific and Cultural Organization
UNFPA	United Nations Fund for Population Activities
UNHCR	United Nations High Commissioner for Refugees
UNICEF	United Nations Children's Fund
USAID	U.S. Agency for International Development
WB	World Bank
WFP	World Food Programme
WHA	World Health Assembly
WHO	World Health Organization

Roll Back Malaria is a global partnership founded by the governments of malaria-afflicted countries, the World Health Organization, the UN Development Programme, the UN Children's Fund and the World Bank. Its objective is to halve the burden of malaria for the world's people by the year 2010 by saving lives, reducing poverty, boosting school attendance and making life better for millions of people living in poor countries, especially in Africa.

If you are interested in becoming part of the Roll Back Malaria movement, receiving the RBM newsletter and becoming part of the global success story in reducing malaria, please write to:

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