

AFRICA CHILD SURVIVAL INITIATIVE
COMBATTING CHILDHOOD COMMUNICABLE DISEASES
(ACSI-CCCD)

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CONTROLLING MALARIA IN FRANCOPHONE AFRICA: TAKING THE INITIATIVE

A SERIES OF PAPERS ON THE ACSI-CCCD
MALARIA INITIATIVE



MALARIA



UNITED STATES AGENCY FOR INTERNATIONAL DEVELOPMENT
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U.S. DEPARTMENT OF HEALTH AND HUMAN SERVICES

Public Health Service
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Controlling Malaria in Francophone Africa: Taking the Initiative

A series of papers on the ACSI-CCCD Malaria Initiative

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Joseph F. Naimoli
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FOREWORD

Stanley O. Foster

Malaria and malaria-caused anemia kill an estimated 1-2 million African children each year.¹ Malaria is a major, perhaps the most important, health impediment to child survival and development in Africa. This volume provides a unique overview of development in action as it compiles malaria presentations from two scientific meetings: 1) the 41st Annual Meeting of the American Society of Tropical Medicine and Hygiene in Seattle, USA (November 1992) and 2) the Africa-wide Forum on Africa's Progress in Child Survival held in Dakar, Senegal (March 1993).

The articles reflect the collaborative work of African Ministries of Health, the World Health Organization (WHO) Regional Office for Africa, and the Centers for Disease Control and Prevention. Carried out as part of the United States Agency for International Development (A.I.D.) Africa Child Survival Initiative-Combating Childhood Communicable Diseases (ACSI-CCCD) Project, malaria activities were an integral part of technical assistance designed to: 1) strengthen African capacity in the planning, implementation, and evaluation of child survival strategies, and 2) reduce morbidity and mortality in children under five.

CCCD is a regional project of A.I.D.'s Bureau for Africa. CCCD has worked with 13 African countries (population 180 million people) for 4-9 years over the period 1982-1993.² This publication has been prepared as part of the analytic agenda of A.I.D.'s Bureau of Africa's Office for Analysis, Research, and Technical Support. It merits study by those concerned about health and development in Africa, by those committed to working with Africans to solve their problems, by those responsible for the planning and implementation of health programs in Africa, and by technical assistance decision makers.

CCCD technical assistance was initiated in 1981 as the Africa Bureau's major health initiative in Africa. Its origin reflects A.I.D. Administrator McPherson's commitment to Child Survival through a "Twin Engine" (Immunization and Oral Rehydration Therapy (ORT)) strategy, the leadership of the late Congressman Mickey Leland and the House of Representatives Select Committee on Hunger, and the Black Caucus. Public support for child survival was provided by numerous organizations, including the U.S. Committee for the United Nations Children's Fund (UNICEF), Bread for the World, and Results. United States Government support was formalized through a Congressional line item appropriation for Child Survival and the Development Fund for Africa.

In the initial stages of CCCD planning, the design team was instructed not to include malaria, largely as a result of the failed eradication program of the 1960s and 1970s. As the design team met with African health officials, they were told that malaria was an essential component of any approach to child survival in Africa. Much to A.I.D.'s credit, malaria was incorporated into

CCCD planning initially as operational research and eventually as a major technical strategy, along with immunization and ORT.

As well described by Steketee et al.³, the malaria situation in Africa at the start of the program can best be described by the word “chaos”. Malaria activities were largely limited to underfunded and ineffective efforts at vector control in urban areas. The magnitude of the problem was poorly understood, leadership and resources were limited, and policies were outdated. Practices reflected largely the advertising inputs of pharmaceutical interests.

The early years of CCCD were spent in strengthening malaria leadership at the country level. This included the identification and training of national malaria experts and the development of national capacities to carry out in-vivo testing of *Plasmodium falciparum* drug sensitivity. CCCD-assisted development of health information systems documented increasing malaria morbidity and mortality. With assistance from CDC malaria experts, a pattern of increasing drug resistance and severe pediatric anemia was documented. Based on these data, malaria policies were developed at the country level.

Simultaneously, CCCD’s activities in training and health education began to identify major deficiencies in program implementation. These deficiencies included a lack of essential basic commodities and supplies, a lack of health worker understanding of policy and practices, poor compliance with the established case management standards of clinical assessment and treatment, and poor communication of essential information to the caretakers of sick children.

This volume provides an insight as to how a technical assistance project set about to empower national health officials to address basic issues of malaria policy, program planning, implementation, and evaluation. Malaria morbidity and mortality continue to rise. There are no “silver bullets”. Managers are faced with an increasing problem, imperfect solutions, and limited resources. Optimizing the use of available resources is the battle that is described in the following pages. Perhaps the greatest tribute to what is described comes from the final paper by Deogracias Barakamfitiye of WHO, and his colleagues: “The ‘Malaria Initiative’ is one response to the pessimists who allege that mosquitoes, parasites, and poverty have won the battle in Africa. Those who claim that political and socio-economic conditions are so extraordinarily difficult that little can be achieved on the continent about malaria are wrong. The evidence is, that by building on previous experiences both good and bad, 21 francophone countries have joined with the Centers for Disease Control and Prevention and the World Health Organization to go beyond previous approaches to malaria control”.⁴

In the broader context of development and technical assistance, the CCCD experience provides six important lessons:

1. The challenge for technical assistance is the empowerment of national decision-makers to identify and solve their problems.
2. For major issues such as child survival, a regional multi-country approach, in which countries share together in problem identification and solution, has a greater probability of making progress. Considering the costs of project development, it is also cost-effective.
3. Mutually respectful collaboration among national authorities, international organizations, and bilateral agencies is essential for effective implementation of development assistance.
4. Health development requires a phased, multifaceted strategy including policy development, program planning, training, management, implementation, monitoring, and evaluation.
5. Utilization of the expertise of the world's pre-eminent public health institution, the Centers for Disease Control and Prevention, provided essential technical inputs to a development strategy.
6. A.I.D.'s ACSI-CCCD technical assistance was and is effective in focusing attention and resources on a major obstacle to development.

References:

1. Breman JG, Campbell CC. Combatting severe malaria in African children. *Bull World Health Organ* 1988;66:611-20.
2. Foster SO, Sheppard J, Davis JH, Agle AN. Working with African nations to improve the health of their children. *JAMA* 1990;263:3303-5.
3. Steketee RW, et al. Controlling malaria in Africa: Progress and priorities. ACSI-CCCD Catalogue Number 099-4050, Atlanta: CDC, 1993.
4. Barakamfitye D, Breman JG, Parker KA. The Malaria Initiative: Where do we go from here? In: Naimoli JF, Nguyen-Dinh P, eds. *Controlling malaria in francophone Africa: Taking the initiative*. ACSI-CCCD Catalogue Number 099-4016, Atlanta: CDC, 1993: 61-8.

Introduction

Joseph F. Naimoli, Phuc Nguyen-Dinh

Malaria Control in the 1990's and the Malaria Initiative

Despite the progress made in malaria control in the 1980's, malaria-attributable morbidity and mortality continue to increase in numerous African countries. In the face of this severe and worsening problem, program managers face several major challenges. First, they must vigorously address a serious problem with minimal resources and imperfect tools, while continuing to evaluate promising new technologies and the most favorable conditions for their use. Second, they must find creative ways, with assistance, to maximize their considerable expertise and practical experience by sharing and discussing their data, and analyzing the implications of the data for control efforts. Third, managers must continually modify their policies and refine their national plans as more and better technical information becomes available, and greater experience is gained. Fourth, comprehensive and properly sequenced implementation strategies are urgently needed to improve case management and prevention. Finally, program managers need evaluation skills and support in using evaluation results to improve their programs. A coordinated effort involving ministries of health and international assistance agencies will be needed to support managers in their continuing efforts to combat the disease.

Building on malaria control efforts begun in the 1980's, and in response to the previously stated challenges and expressed needs of program managers, the Combatting Childhood Communicable Diseases Project (CCCD) has recently increased its emphasis on the programmatic aspects of malaria control. Since 1990, CCCD has promoted a more comprehensive, management-oriented approach to improving health services. This management approach, referred to as the "Malaria Initiative", has been strengthening the leadership and managerial capacities of malaria control coordinators and other decision-makers in francophone Africa. The initiative is part of a larger international commitment to improve malaria control efforts in developing countries¹, and part of an increasing trend toward supporting program managers in assuming greater ownership and direction of the program development process for primary health care.²⁻³

The Malaria Initiative Approach

The Malaria Initiative has adopted an approach to public health programming that incorporates policy review and revision, rational planning, systematic program implementation, and program evaluation. This approach is assumed to lead to effective case management of malaria, with subsequent reductions in morbidity and mortality (See Figure 1). The initiative has been conducted in collaboration with ministries of health and the World Health Organization (WHO), and has challenged malaria control managers and other public health professionals to address their malaria control programs in a systematic manner.

THE MALARIA INITIATIVE A MANAGEMENT-ORIENTED APPROACH TO IMPROVING HEALTH SERVICES

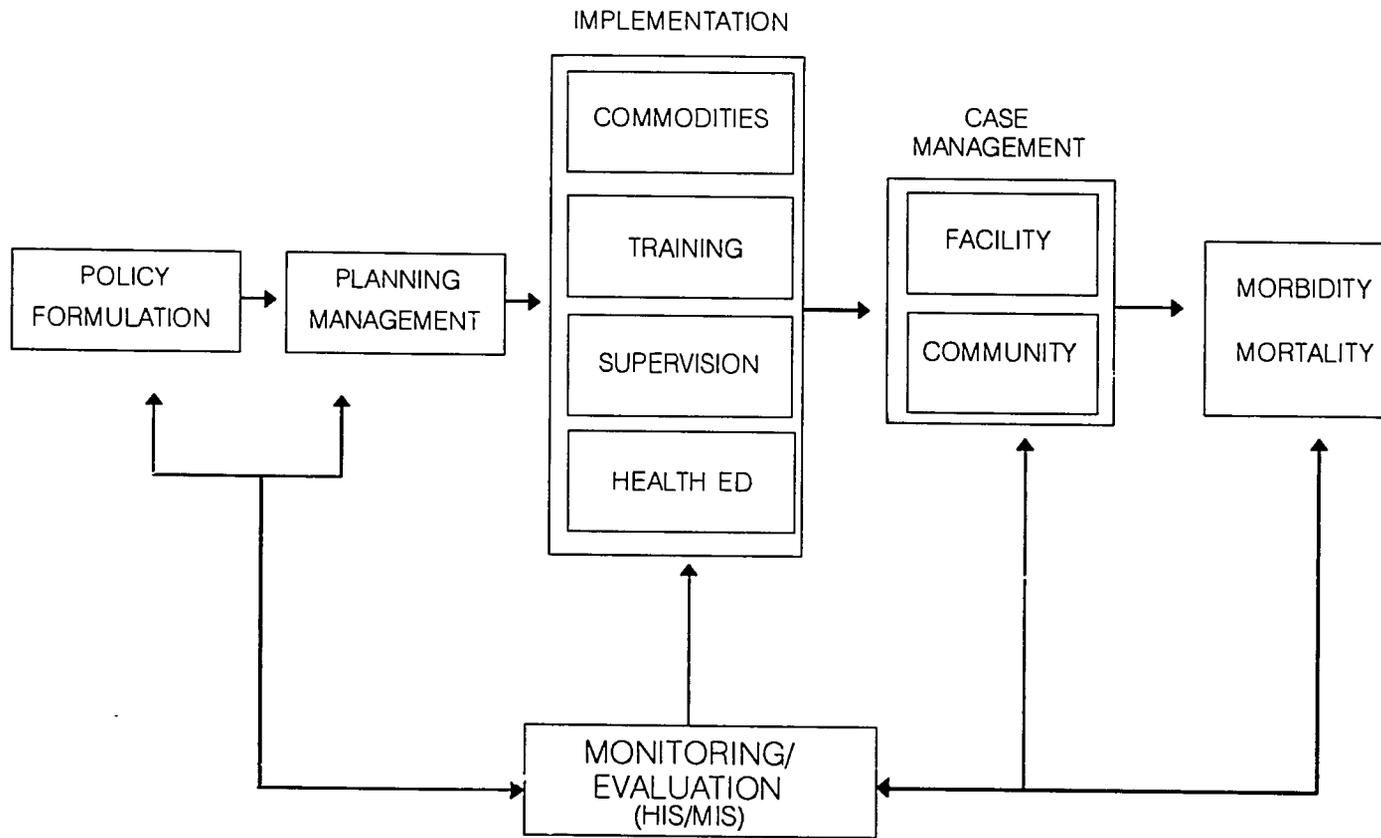


Figure 1



The initiative has promoted innovative strategies for building decision-making skills in disease control *policy development*. Senior program managers from 17 countries began a policy review and revision process at a regional workshop, which was designed and implemented by their peers and colleagues from the Centers for Disease Control and Prevention (CDC) and WHO, in 1991, in Bobo-Dioulasso, Burkina Faso. Managers systematically reviewed data collected in African countries, shared past and present experience in malaria control, considered alternative policy options and available resources, and developed or refined functional policies on the basis of these activities. The workshop resulted in improvements in both the technical quality and the comprehensiveness of national malaria control policies. Collaborative follow-up activities in selected countries have helped to refine the policy developed at the workshop, as well as engage other key decision-makers in a consensus-building process.

The initiative successfully promoted the adoption of a practical approach to *program planning*. The use of an educational systems development process, which included needs assessment, instructional design, collaborative curriculum development, training, consultation, and evaluation, has strengthened program managers' planning skills. This process, applied in both a regional workshop setting (Abidjan, May 1992) and in subsequent technical assistance visits to selected countries, has resulted in increases in both the completeness and quality of malaria control program plans. Most importantly, program managers participated fully in each stage of the process.

The initiative has refocused attention on the need to undertake major program activities, such as drug management, health worker training, and supervision, in a manner that is both comprehensive and logically sequenced. While the initiative has not had the opportunity to assist countries in implementing any one or all of the major *implementation* strategies, technical assistance in several countries has laid the groundwork for subsequent action to improve the quality of care in health facilities.

Malaria control program managers have expressed their desire to develop skills in *evaluation*. Their priority concerns include defining different levels of program objectives; selecting, tracking and interpreting indicators of program implementation and outcomes; and making rational decisions based on these data. Preliminary work in collaborative formulation of objectives and indicators was completed in 1992, and a working group refined and field tested the indicators in 1993.

Overview of Monograph Papers

Participants in the Malaria Initiative have written about their experiences, discussed their ideas with colleagues, and shared their experiences and findings with the professional community at international conferences in both the United States and Africa. This monograph is an effort to bring together in one place several of the key presentations delivered at various conferences. Previous versions of these papers were presented at the annual meeting of the American Society of Tropical Medicine and Hygiene, in Seattle, Washington, USA (November 1992) and at the Africa-wide Forum on Africa's Progress in Child Survival, in Dakar, Senegal (March-April 1993).

The papers in *Section One* describe malaria's impact on child morbidity and mortality in Africa, underscore its socio-economic consequences in the region, and summarize the epidemiological and behavioral dimensions of malaria from the perspective of a field manager.

In *Section Two*, the four phases of the Malaria Initiative are described in the order in which they have been carried out. The first two papers address how the initiative has helped to further develop the policy-making and planning skills of program managers. The next three papers describe the first steps taken by several countries to improve program implementation. The final paper describes the initiative's contribution to building competencies in program evaluation.

What have we learned from the Malaria Initiative? *Section Three* offers several "take-home messages." The paper in this section summarizes the salient points from the previous papers, and suggests future directions for continued improvement of malaria control in Africa.

Summary

The Malaria Initiative has promoted a public health management approach to help African ministries of health make informed decisions on the basis of data, and to lay the groundwork for taking concerted actions to combat the disease. The Initiative has mobilized programmatic experience and technical expertise to reinforce the management skills of senior-level ministry personnel. Regional workshops, country-specific technical assistance visits, and working group consultations have all been used to improve skills in policy development, planning, implementation, and evaluation. The different elements of the Malaria Initiative approach have been continually modified and adapted to fit the needs of the particular countries and the special nature of the malaria problem. The initiative has contributed to a broader international effort to draw greater attention to the problem of malaria in Africa, and to mobilize resources to do something about one of the most severe public health problems on the continent. It is hoped that this collection of papers will contribute to these continuing efforts on the behalf of health providers and African families and communities. Furthermore, the developmental process described in this monograph may be of interest to public health professionals with a broad concern for child survival in Africa.

References

1. World Health Organization. Global malaria control strategy (CTD/MCM/92.3). Geneva: WHO, 1992
2. World Health Organization. Guidelines to conduct a focused programme review (FPRO, Phase I and Phase II). Geneva: WHO, 1993.
3. World Health Organization. Community involvement in health development: Challenging health services. Report of a WHO Study Group. WHO N° 809. Geneva: WHO, 1991.

SECTION ONE

Malaria in Africa

Malaria in Africa: Epidemiologic and Economic Considerations
El Hadi Benzerroug, André Beljaev, Deogracias Barakamfitiye

A Field Manager's Perspective on Malaria in Africa
Serge Nkurikiye, Jean-Baptiste ROUNGOU, Linda J. Schultz

Malaria: Epidemiologic And Economic Considerations

El Hadi Benzerroug, André Beljaev, Deogracias Barakamfitye

Introduction

Malaria remains one of the most serious public health problems in Africa. More than 100 million cases of malaria occur annually on the continent. This figure represents more than 90% of the cases worldwide. Of the more than one million deaths attributed to malaria every year, the overwhelming majority occur in the African Region¹, where malaria is a major cause of childhood mortality. In rural areas of tropical Africa, malaria is taking the life of 1 out of 20 children before the age of five¹. This severe health impact is accompanied by a substantial economic cost, estimated at US\$ 800 million in 1987, and expected to rise to US\$ 1700 million by 1995.²

Geographic Distribution

Nearly everywhere in Africa—where the lethal parasite species, *Plasmodium falciparum*, predominates—the natural environment is conducive to the presence or proliferation of malaria. Most of the continent south of the Sahara constitutes an “area of optimal *malaria* transmission” (Figure 1). This includes ecosystems of equatorial and tropical forests, and of Sudanese savannas. In such areas the level of transmission is extremely high, much higher than anywhere else in the world. Transmission is usually perennial, often with seasonal fluctuations, with increased transmission occurring during the rainy season and shortly thereafter. Malaria is highly endemic in this zone, stable, and very refractory to control interventions. In these areas, about 30% of febrile illnesses are attributable to malaria.

The factors favoring optimal transmission are summarized below.

The presence of efficient vectors. In Africa, several good vectors are present, often at the same time, with members of the *Anopheles gambiae* complex playing a major role. This species complex is important for a number of reasons. Chief among them are their predominant peridomestic habitat (i.e. their tendency to breed around human dwellings, often using breeding places created by human activities), and the anthropophily (i.e. a predilection towards taking their blood meals on humans) of *A. gambiae sensu stricto*.

A high prevalence of malaria infections in human hosts. This high prevalence provides a large reservoir on which mosquitoes can get infected and thus perpetuate the transmission cycle.

Malaria Situation

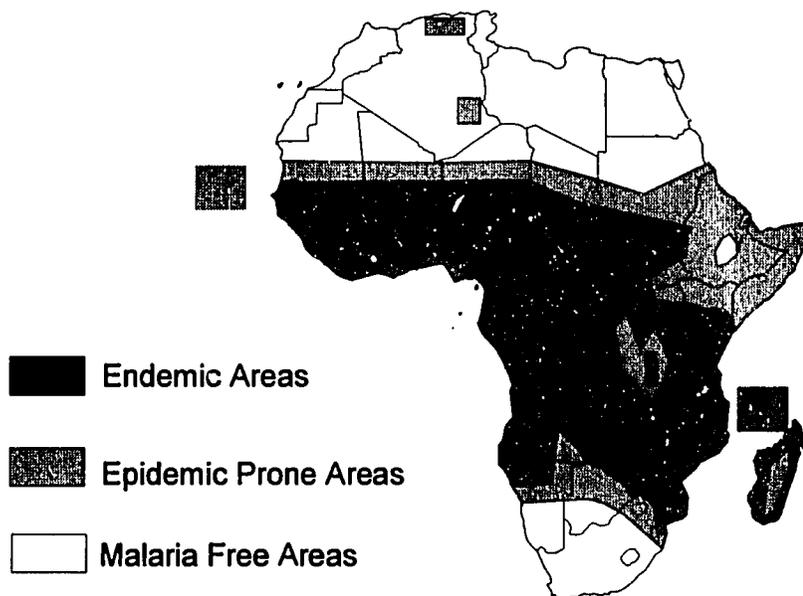


Figure 1

Abundant rainfall. Rainfall is sufficient to ensure the existence of *Anopheles* breeding sites, and to maintain the level of humidity needed for a mosquito survival rate that permits completion of the parasite cycle in the insect vector.

Favorable temperatures. Mean temperatures average between 24°C and 28°C, which are optimal for the development and multiplication of parasites in the mosquitoes and for survival of the vectors.

Outside these “optimal transmission areas”, there are regions where the transmission of malaria is less intensive or non-existent. Transmission is impossible in certain geographic areas: 1) in the Southern regions of Africa, particularly in the Cape Province of South Africa; 2) in deserts such as the Sahara, Ogaden, and Kalahari; 3) in the mountains and highlands, at altitudes above 2000-2500 m in peri-equatorial areas (e.g., in Ethiopia, Kenya, Tanzania), and above 400 m in South Africa.

Between “optimal” and “less intensive” areas of transmission, transition belts of unstable malaria can be found. Here transmission can be interrupted, following particular seasonal patterns or for longer periods of time (sometimes for several years). Unstable malaria occurs in the desert fringes, highlands and low mountains.

Finally, within the three major transmission zones mentioned above—optimal, less intensive and unstable—are scattered “azonal inclusions” in which conditions differ from those in the major zones. Examples of such azonal inclusions are constituted by the oases of the Sahara desert, or by river valleys crossing arid lands, such as those bordering the Niger or Nile rivers. In these areas, malaria transmission may be intensive, contrasting with the low or absent transmission in adjacent areas. Another example of azonal ecosystems are cities and towns where transmission is, as a rule, lower than in the neighbouring rural areas.

Epidemiologic Surveillance

Malaria-attributable disease and deaths are inadequately reported in the majority of the countries of the African Region. This situation is due to several factors: most patients suffering from malaria do not visit a health facility; the disease reporting system in most countries is not completely functional; and case definitions of malaria may vary between countries. Malaria-related statistics must be approached with caution due to these limitations. However, similar reports from different countries have corroborated disquieting trends.

In many countries of sub-Saharan Africa, there has been an increase in malaria incidence. Brinkman and Brinkman³ have reported an increase of severe cases in Zambia and an increased malaria incidence in Togo, Zambia and Rwanda. In recent years, epidemic outbreaks of various types have been documented in a number of countries. The largest outbreaks have occurred in high altitude areas in Madagascar, Ethiopia, Swaziland, Rwanda, Burundi and Zimbabwe. Another type of outbreak has been found in desert fringe zones, in Sudan, Botswana and Namibia. Epidemics have also occurred among population groups that had no immunity or had lost it. Perhaps this is best illustrated by outbreaks of malaria in Ethiopia among settlers relocating from malaria-free highlands to very malarious lowlands.

During the last decade, chloroquine resistant *P. falciparum* has spread throughout most of the African Region. In addition, isolated cases of therapeutic failures of pyrimethamine/sulfadoxine have been reported in some countries of the south and central parts of the continent.

Economic Impact

Recent research indicates that malaria's economic cost parallels its health impact: both are unacceptably high and increasing². Malaria's impact in Africa can be measured in both direct and indirect costs. Direct costs are incurred for the treatment and prevention of malaria, while indirect costs include elements such as the economic losses associated with malaria mortality

and morbidity, such as days of work lost. Both direct and indirect costs can be calculated in relation to the individuals, to families or to the national economy. Another kind of cost, the intangible impact of malaria on health and consequently on the quality of life, is real but difficult to quantify.

To calculate the economic impact of malaria, Shepard et al.² identified and analyzed more than 1000 documents related to the subject, and developed a model to assess the economic cost of malaria. Using available data from Chad, Rwanda, Burkina Faso and Congo, they developed case studies for these 4 countries. Costs were calculated for the recent past and projections to 1995 were made based on recent epidemiological trends. Estimates for all of sub-saharan Africa were derived from averages of the four case study sites. In 1987, a case of malaria cost \$9.84; \$1.83 of this was attributed to direct costs and \$8.01 to indirect costs. By 1995, the average cost of a malaria case, as projected, will rise to \$16.40. This is due primarily to the increasing severity of cases and to chloroquine resistance (Figure 2). For Africa as a whole, the annual economic burden of malaria was \$ 0.8 billion in 1987. Estimates for 1995 are \$1.7 billion.

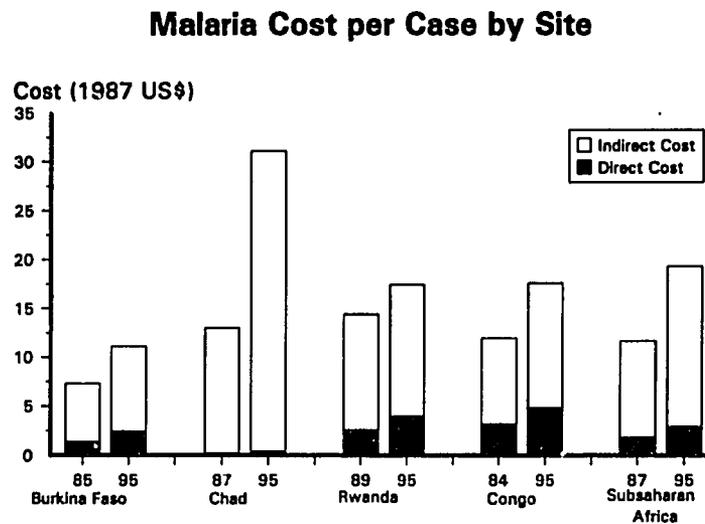


Figure 2

Africa is going through a major economic crisis. Thirty-three out of the 44 countries of the world classified in the low economic development group are in Africa, and have a per capita income estimated at below US \$300.00 per year in 1987⁴. While African countries have accorded a high priority to malaria, this economic situation precludes adequate funding of malaria control programs. In addition, and as a consequence of the general economic crisis, governmental expenditures on health have dropped from a 4 percent share of total government expenditures in 1975-79 to a 3.7 percent share in 1980-84, and to 3.5 percent in 1985-89⁵. The limited health budgets in Africa (less than \$3 per capita) have prevented governments from addressing the malaria problem without major outside assistance. Conversely, malaria hampers economic development, thus reinforcing the vicious circle of disease and poverty.

The challenge for malaria control programs is to break out of this vicious circle. While the cost of control measures is not insignificant in relation to the budgets of African ministries of health, the benefits could be substantial. A reversal of the current malaria-related epidemiologic and economic trends would be welcome not only on humanitarian grounds, but would also contribute to the economic development of the continent.

References

1. World Health Organization. World malaria situation in 1989, Part 1. *Wkly Epidemiol Rec* 1991;66:157-63
2. Shepard DS, Ettling MB, Brinkmann U, Sauerborn R. The economic cost of malaria in Africa. *Trop Med Parasitol* 1991;42:199-203
3. Brinkman U, Brinkman A. Malaria and health in Africa: the present situation and epidemiological trends. *Trop Med Parasitol* 1991;42:204-13.
4. United Nations Development Program. Human development report 1990. New York:UNDP, 1990.
5. World Bank. Better health in Africa, 1993. Technical Working Paper No 7. Washington: World Bank, 1993.

A Field Manager's Perspective On Malaria In Africa

Serge Nkurikiye, Jean-Baptiste ROUNGOU, Linda J. Schultz

Introduction

In this presentation, we will examine some important epidemiologic and behavioral aspects of malaria control, from the perspective of an African program manager. We will illustrate these aspects with data collected by the Ministries of Health of selected countries that have participated in the Africa Child Survival Initiative-Combating Childhood Communicable Diseases Project (ACSI-CCCD).*

Epidemiologic Profile

Morbidity and Mortality

During the past ten years, malaria morbidity and mortality have been increasing in Africa. This trend is well documented in Togo and Burundi, two small countries with relatively good health information systems (Fig. 1). In Burundi, both the number of malaria cases and malaria deaths reported from health centers have increased five-fold between 1980 and 1991. A similar trend is seen in Togo, with the decrease seen in 1990 probably an artifact of under-reporting due to political turmoil.

**Malaria Morbidity and Mortality in
Togo (1984-1990) and Burundi (1980-1991)**

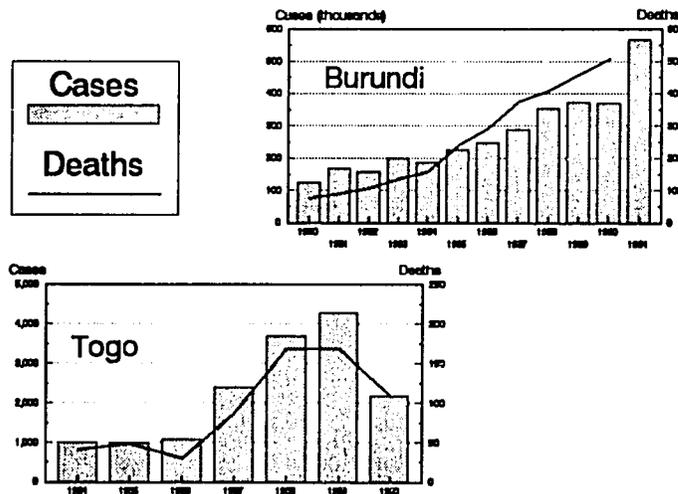


Figure 1

* A regional project supported by the United States Agency for International Development (A.I.D.)

Such increases in malaria cases and deaths are greater than would be expected simply from population growth alone. In Burundi, for example, malaria incidence has risen from 41.6/1000 in 1984 to 79.7/1000 in 1990. Malaria mortality has increased from 0.04/1000 to 0.08/1000 in that same time period (Fig. 2).

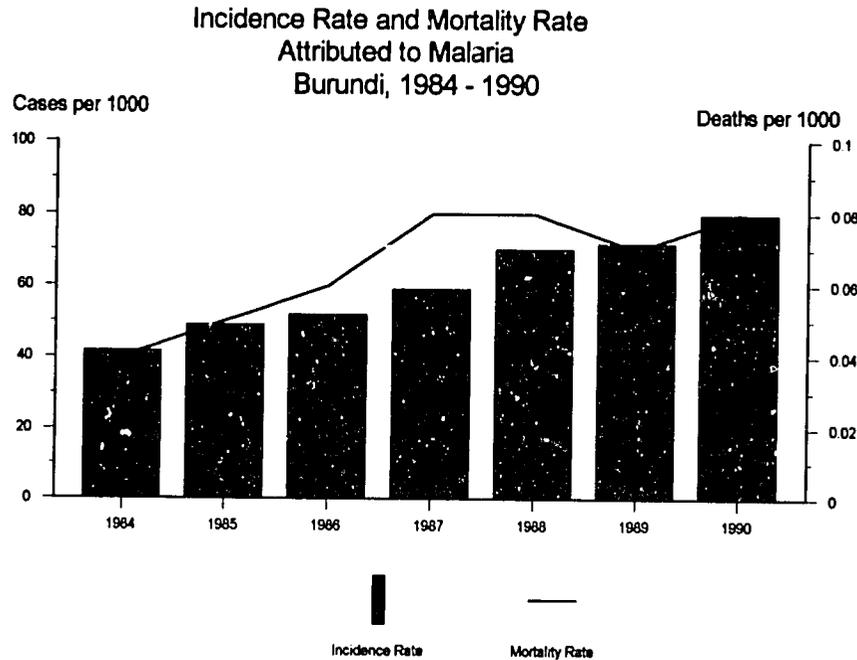


Figure 2

Hospital-based figures are often the only sources for reported cases of malaria morbidity and mortality. However, these figures grossly underestimate the actual magnitude of the malaria problem in Africa, and therefore represent merely the tip of the iceberg. In Togo, for every death that occurs in a hospital, it is estimated that 31 deaths occur at peripheral health facilities or at home, and thus are unreported. During a study in the Gambia in 1982-1983, of 25 children dying of an illness attributed to malaria, none died in a hospital, 2 died in a dispensary, and 23 died at home.¹

Additionally, the accurate assessment of malaria morbidity and mortality is hindered by the fact that the diagnosis of malaria is usually based on clinical impression alone. Microscopic examination is typically limited to referral health facilities. This "presumptive diagnosis" approach, recommended by the World Health Organization (WHO), is justified given the current situation in most African countries. The large numbers of febrile patients presenting each day in urban and rural health facilities make microscopic diagnosis logistically difficult, particularly since malaria control programs are severely constrained by personnel and funding limitations. Furthermore, the prevalence of asymptomatic parasitemia in populations living in malarious areas is high, complicating the information gained by microscopic evaluation.

A Field Manager's Perspective On Malaria In Africa

The fact that a diagnosis of malaria is often based on fever, as well as issues of data completeness and quality, should be kept in mind when interpreting malaria-related mortality and morbidity information. However, while African countries continue to improve their health information systems, program managers are obliged to make policy and programmatic decisions based on data available to them.

What is the population group most affected by malaria in subsaharan Africa? Under conditions of intense transmission, malaria takes its greatest toll on young children, who have not yet developed the immunity to malaria found in most Africans adults. In Malawi, 29% of hospital admissions among children aged less than five years are due to malaria. In Togo, 44% of hospital admissions among children aged less than 15 years are attributed to malaria. In Burundi, 17% of all children under five presenting at health facilities are diagnosed as having malaria (Fig. 3).

Causes of Pediatric Morbidity in 3 African Countries

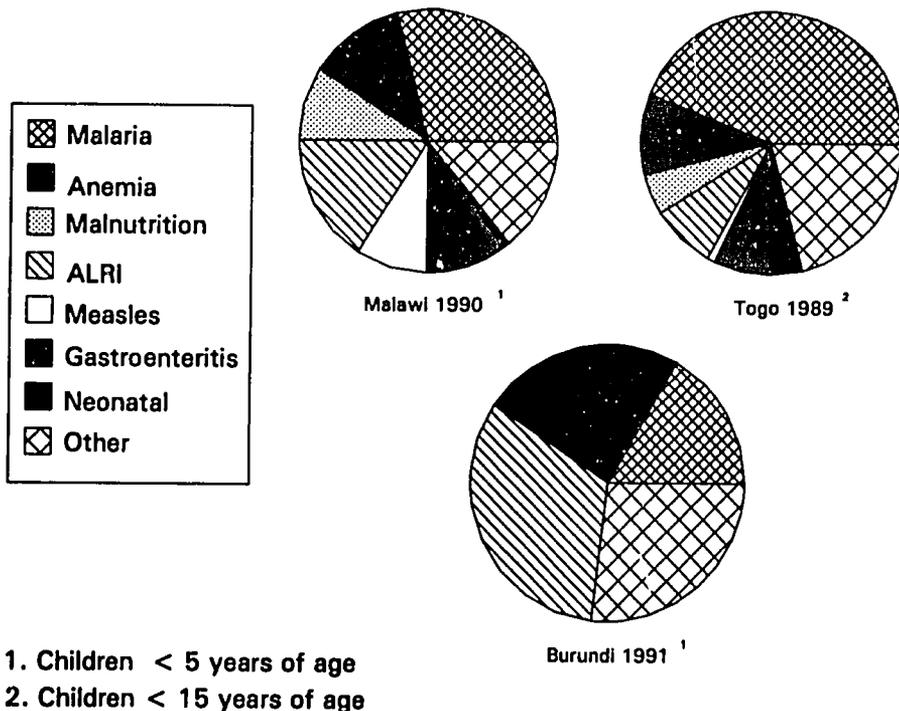


Figure 3

The distribution of malaria-related mortality among children parallels that of pediatric morbidity (Fig. 4). Malaria accounted for 19% and 16% of reported hospital deaths in children aged less than five years in Malawi and Togo, respectively, and for 15% at a large urban hospital in Zaire.

Causes of Pediatric Mortality in 3 African Countries

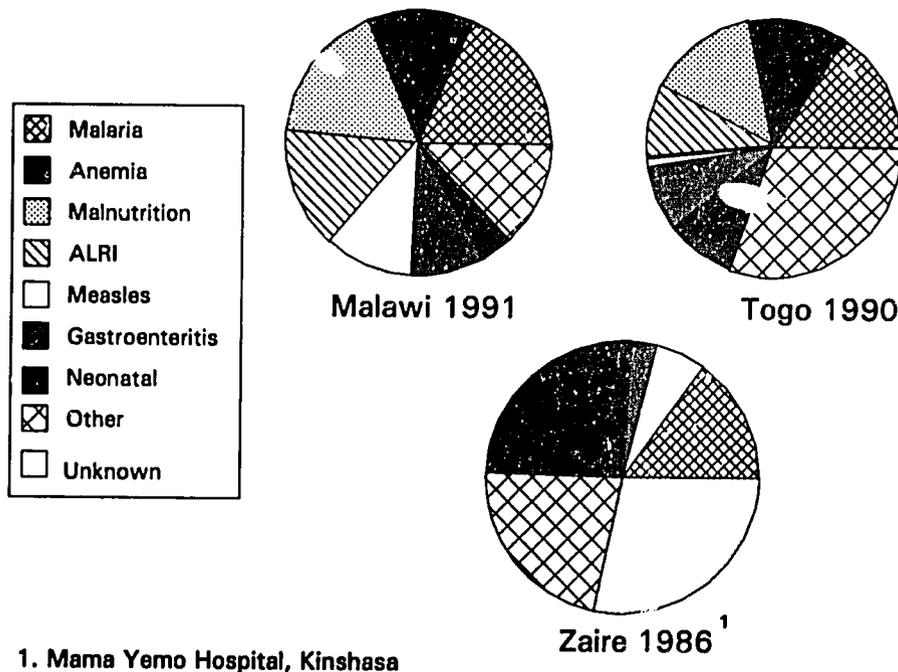


Figure 4

Anemia and malaria

Malaria also contributes to anemia, another major cause of morbidity and mortality among children in Africa (Figs. 3,4). Statistics from Togo on hospital-based deaths show parallel trends for malaria and anemia (Fig. 5). Although this does not prove a causal relationship between these two diseases, malaria's toll on human health may, in part, be reflected by an increase in the incidence of malaria-associated anemia.

Malaria and Anemia as Causes of In-Hospital Deaths, Togo, 1984 - 1990

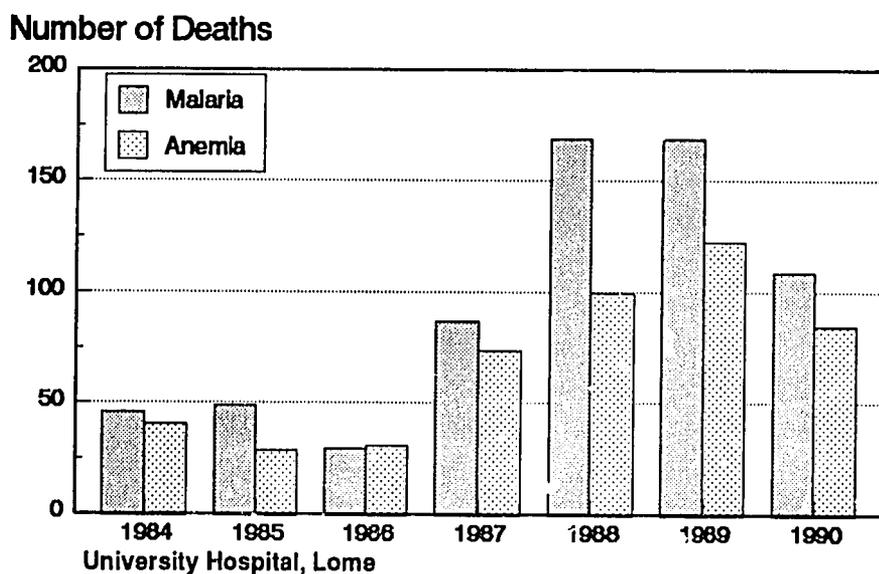


Figure 5

Drug resistance

The increasing importance of malaria-associated anemia is probably related to the spread of drug resistance, a development with important epidemiologic and logistical implications for Africa. Chloroquine resistance is now a fact of life throughout subsaharan Africa, and has required important changes in drug use policy in Malawi, one of the countries most affected by the problem.

Epidemics

Another factor contributing to the worsening situation in Africa is the recent occurrence of epidemics in some areas of the continent. In the case of Burundi, two epidemics occurred in highland areas, where malaria transmission was low or absent until recently (Fig. 6).

Epidemic Malaria in Burundi

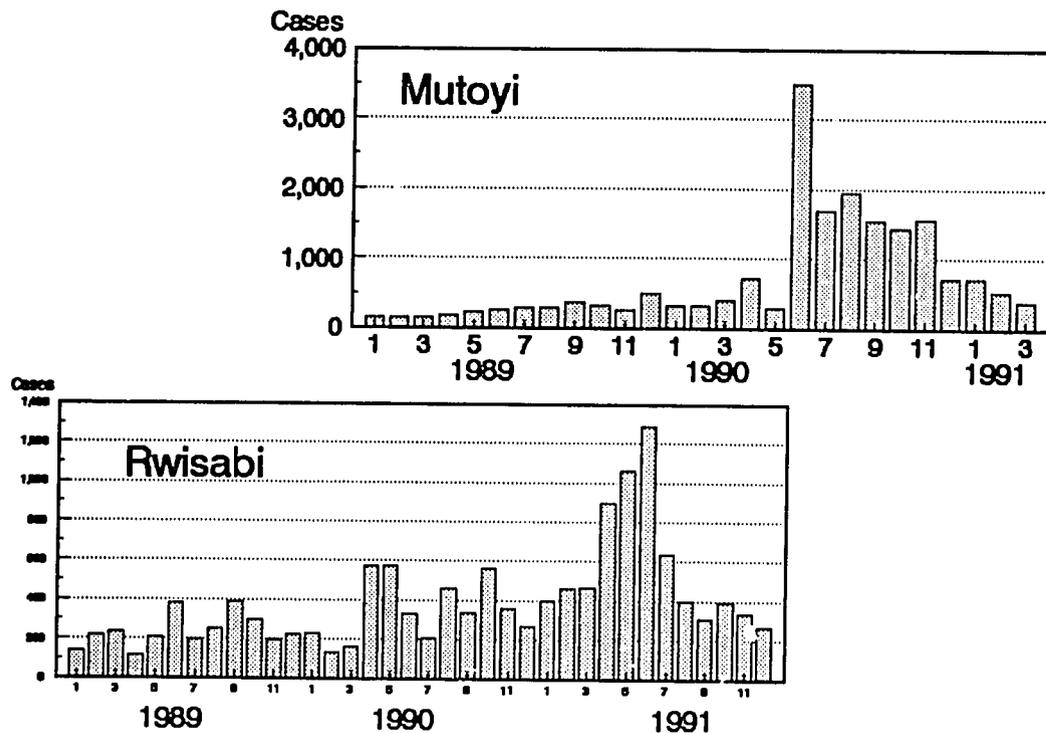


Figure 6

The first epidemic was noted in 1990 in Mutoyi, where a six-fold increase above the expected number of malaria cases occurred. Another epidemic occurred in 1991 in Rwisabi, where the number of cases tripled. The most likely explanation for these epidemics was increased transmission of malaria among a population with low immunity. This change in transmission pattern may be due to the creation of new mosquito breeding sites by agricultural projects (such as rice and fish farming), or by the introduction of parasites through human migration into these areas.

Social and Behavioral Factors

Stop and think for a moment about a day in the life of a mother and her child in an African village. Obviously, this mother would like to keep her child healthy. But how can she prevent her child from contracting malaria if she doesn't even know that the disease is transmitted by mosquitoes? During a knowledge-attitude-practices (KAP) survey in 1992 in the Central African Republic (C.A.R.), 534 mothers were asked what they thought caused their child to contract malaria. The majority thought that malaria was acquired by cold weather, or by rain, or they said they did not know the cause. Only 23% identified mosquito bites as the causal factor. In a similar survey in Zaire, 46% of the mothers did not know that mosquito bites were the route of transmission of malaria.

If her child develops fever, which is likely to be malaria in this setting, does the mother know how to treat her child properly? Results of a similar KAP survey in the C.A.R., suggest that not all mothers know how to give CQ to treat their febrile child. When their children developed a febrile illness, nearly 40% of the mothers failed to give chloroquine, the recommended first line antimalarial drug in the country (Fig. 7).

Home Treatment of Febrile Illness* Central African Republic, 1992

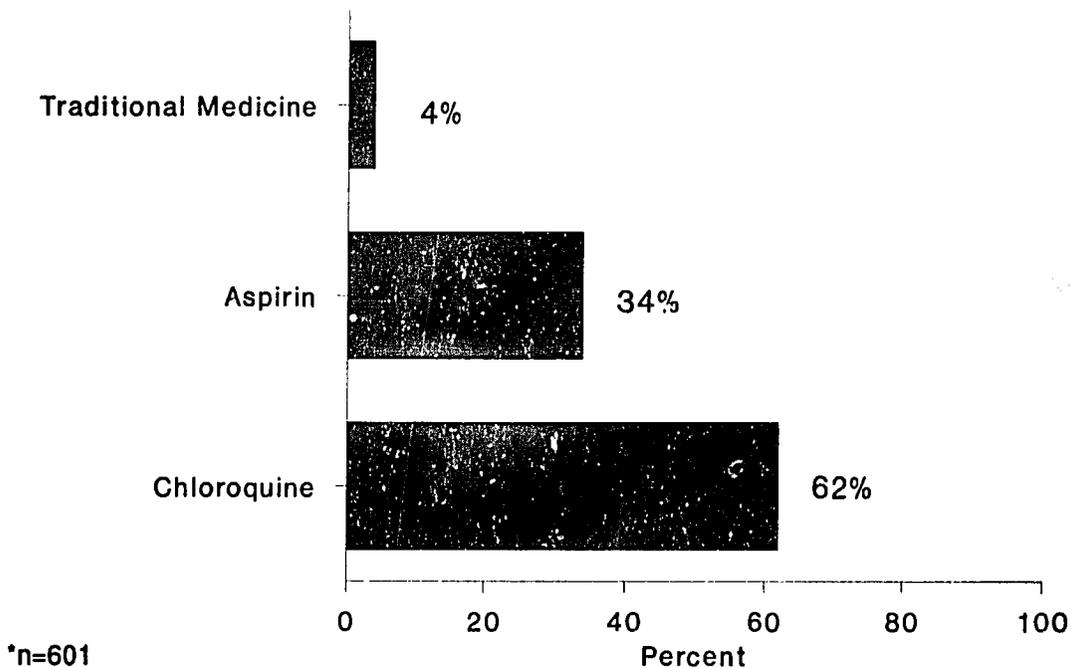


Figure 7

However, an encouraging finding is that the majority of those mothers who administered treatment did so during the first day of illness. Because malaria can be rapidly fatal in children, early treatment is emphasized in proper case management of malaria. Among 425 mothers interviewed in the C.A.R. survey, 86% stated that they administered treatment on the first day of fever (Fig. 8).

Day Treatment was Initiated
for Febrile Illness
Central African Republic, 1992

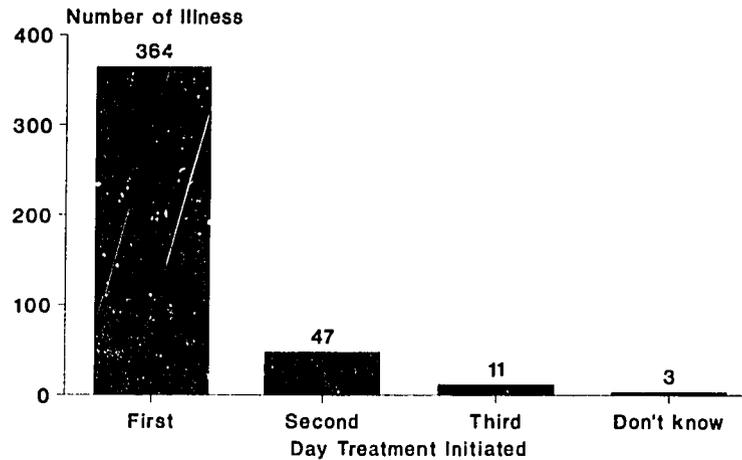
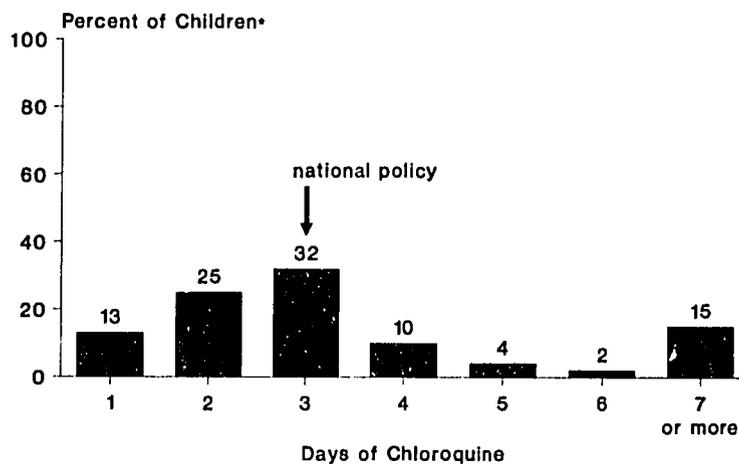


Figure 8

Unfortunately, many mothers who treat their children at home do not administer the recommended three-day course of treatment. In C.A.R., one third of mothers treat their children with a three-day course of chloroquine, one third treat for less than 3 days, and one third for more than 3 days (Fig. 9).

Duration of Home Treatment
with Chloroquine
Central African Republic, 1992



• n=343

Figure 9

As we know, this mother may not be able to treat her child adequately without the help of a health care worker. If she fails to bring the child to a health care facility promptly, how can the health care worker treat the child? In C.A.R., mothers are encouraged to bring their children to a facility at the first sign of illness. Unfortunately, 28% of mothers surveyed said they did not take their child to a health care facility during his/her most recent febrile illness.

Once the woman brings her child to the health facility, how can the health care worker treat the child if antimalarial drugs are not available? In Côte d'Ivoire in 1991, among 39 health facilities surveyed, 74% had no chloroquine in stock. Obviously, the child will not receive appropriate treatment in this situation. Furthermore, the mother who may have to walk half a day or more only to find that there are no medications available for her child is likely to think twice about seeking care at the health facility the next time her child is sick.

If health care posts lack antimalarial drugs, mothers must seek medications in pharmacies or at private retailers. According to the C.A.R. survey, nearly two thirds of mothers obtained the drug at private pharmacies, without a prescription (Fig. 10).

**Source of Antimalarial Drugs
Among Mothers Treating Febrile Illnesses
Central African Republic, 1992**

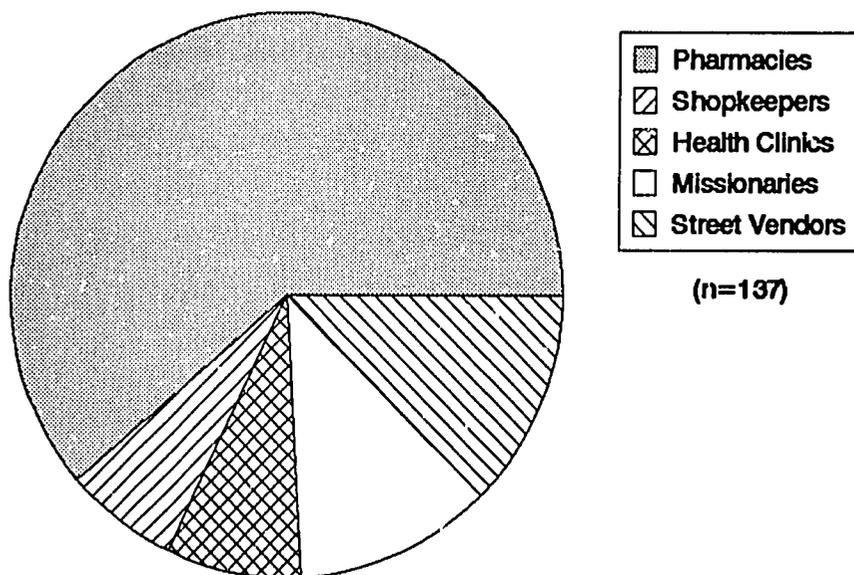


Figure 10

The cost of antimalarial drugs is a major issue for families, whether they obtain them from health workers or pharmacists. In many countries, the sale of chloroquine is restricted to brand name drugs only, at a cost prohibitive to the majority of the population. Even generic forms of

chloroquine, produced and sold in some African countries, are difficult for most of the population to afford. A price comparison between chloroquine provided by UNIPAC, the central store of the the United Nations Children's Fund (UNICEF), and chloroquine sold in private pharmacies in C.A.R., Liberia, Madagascar, Mauritania, and Nigeria, show that the latter is four-to eighty-fold more expensive than that at UNIPAC. How do you suppose this mother can afford to treat multiple episodes of fever each year in a situation such as this?

The lack of antimalarial drugs in the health facility is not the only obstacle to quality care. If the health worker does not know or does not carry out the recommended steps of diagnosis and treatment of a febrile child, how will this child get well? A 1990 survey in the C.A.R. showed that only 35% of children treated for fever were given the correct dose of antimalarials by the health care workers. How can a health worker be sure that a mother will continue to administer the recommended treatment at home following a visit to a health facility if the health care worker does not explain to her how to give chloroquine to her child? The health facility survey in the C.A.R. showed that 40% of health care workers do not explain the number of pills to give to the child, and more than 60% do not advise mothers to return to the health facility if the fever persists.

Conclusion

Malaria is a major and worsening problem in Africa, and young children are suffering its greatest impact. We currently have both prevention and treatment tools to combat this disease; unfortunately, they are not being used optimally. Antimalarials must be regularly available in all health facilities, but they are not. Health workers should correctly diagnose, treat, educate and refer febrile patients, but they don't. Parents, the first line providers of care, should know how to prevent and treat malaria in their children, but they don't.

These obstacles can be overcome. Explicit national policy guidelines must be formulated and comprehensive program plans developed. National commitment to the malaria control policy and plans must be secured. Additionally, program managers must work to secure support from the Ministry of Health and donor agencies so that staff and resources are available to ensure that program activities are well executed. Programs should be monitored and evaluated to verify the impact of control programs in helping managers address one of Africa's most severe problems.

References:

1. Greenwood BM, Bradley AK, Greenwood AM, Byass P, Jammeh K, Marsh K, et al. Mortality and morbidity from malaria among children in a rural area of the Gambia, West Africa. *Trans R Soc Trop Med Hyg* 1987; 81:478-86

SECTION TWO

The Malaria Initiative: Policy Development, Program Planning, Implementation and Evaluation

Using Epidemiologic and Behavioral Data to Develop National Policy
Sidi Mohamed M. Lemine, Phuc Nguyen-Dinh, Jennifer Bryce

*A Comprehensive Approach to Improving Malaria Control Program
Plans in Francophone Africa*
Kristin Nicholson Saarlans, Joseph F. Naimoli

The Management of Antimalarial Drugs in the Central African Republic
Dieudonné Yazipo, James C. Setzer, Stephen C. Redd

Health Worker Supervision in Côte d'Ivoire: A Needs Assessment
Joseph Niangue, Joseph F. Naimoli, Mark D. LaPointe

Strengthening Communication Between Health Workers and Mothers
Lardja Sanwogou, Eve M. Nagler, Kathleen A. Parker, Eve M. Lackritz, A. Judith
Chwalow, Joseph F. Naimoli

Developing Skills for the Evaluation of Malaria Control Programs
Kalenga Mbudi Paluku, Phuc Nguyen-Dinh, El Hadi Benzerroug, Jennifer Bryce

Using Epidemiologic And Behavioral Data To Develop National Policy

Sidi Mohamed M. Lemine, Phuc Nguyen-Dinh, Jennifer Bryce

Introduction

The first step in the development of a national public health program is to formulate a policy. Policy formulation involves choosing from among various possible options the priority goals, approaches and interventions of a program, and formulating technical guidelines. Ideally, these decisions should be made by program managers on the basis of reliable and pertinent information. This paper will describe a decision-making approach used by malaria program managers in francophone Africa to develop national policy guidelines for malaria control on the basis of epidemiologic and behavioral data.

Methods

An African regional workshop titled "Policy Development for Malaria Control" was conducted in Bobo-Dioulasso, Burkina Faso, in June-July 1991. Representatives of ministries of health from 17 countries in francophone Africa, most of whom were malaria control program managers, participated in the workshop. Representatives of the World Health Organization (WHO), the Centers for Disease Control and Prevention (CDC) and the Organization for Coordination and Cooperation in Combatting Major Endemic Diseases (OCCGE, which hosted the meeting) also participated.

The workshop had two main objectives. The first was to strengthen program managers' decision-making skills. These skills included identifying data useful in making decisions; distinguishing between opinions and facts; making choices on the basis of an analysis of the advantages and disadvantages of various options; and anticipating the possible consequences of alternative decisions. The second objective was to have participants apply these skills in the development or revision of their national malaria control policies.

The intended product of this effort was, for each participating country, written policy guidelines covering all relevant aspects of malaria control. These guidelines included a goal statement; identification of priority interventions and approaches; case management guidelines for uncomplicated malaria, therapeutic failure, and complicated or severe malaria; and malaria prevention guidelines.

Results

Some examples of how the program managers used the available data and arrived at their decisions are presented in this section.

The goal statement

Program managers reviewed and discussed epidemiologic data from several African countries. These data, either from the published literature or from unpublished work conducted by the participants' ministries of health, confirmed that malaria is an important cause of morbidity and mortality, and that the situation is worsening. Data from Togo indicated that in 1989 malaria was the leading cause of hospitalization: 34% of hospitalizations were attributed to malaria. It was also the leading cause of hospital deaths: 22% of all reported hospital-based mortality. In addition, the number of reported cases of malaria have more than doubled during the past 10 years (Figure 1).

Outpatient Malaria Cases Reported by Year Togo, 1980 - 1990

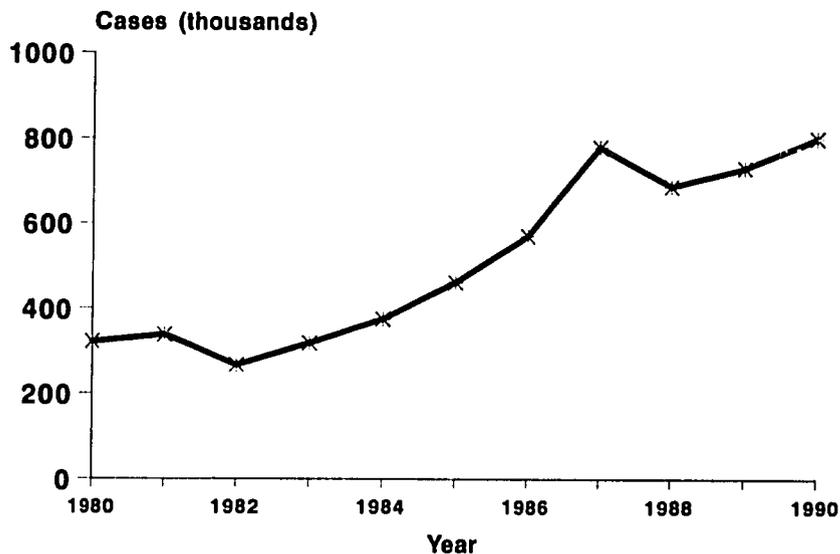


Figure 1

These data were comparable to those of other countries and convinced the managers to select, as goals for their programs, reduction of mortality and morbidity.

Priority interventions

In Africa, young children bear malaria's heaviest burden. For example, in Togo in 1991, 31% of reported cases were among children less than 5 years of age. Malaria is also an important cause of low birth weight^{1,2}. These data persuaded the managers to select two population groups - young children and pregnant women - as the target of their two priority interventions: case management and prevention.

Priority approaches

High levels of malaria transmission and limited resources in most of sub-Saharan Africa obliged most countries to focus their primary attention on case management. However, managers had to make a difficult decision: should they seek to improve case management in health facilities, or aim at improving case management in the home? Participants were confronted with contradictory data.

On the one hand, knowledge-attitudes-practices (KAP) survey data from Togo demonstrated that, in 1984, among 507 children who had experienced a febrile episode in the 15 days preceding the survey, 80% were not seen in a health facility, and 83% received their treatment at home³. Other data indicated that the majority of malaria-attributable mortality occurs mainly in the community: 23 deaths out of 25 in the Gambia⁴, and an estimated 34 out of 35 in Togo. Given these results, one's first instinct would be to opt for improving home treatment over facility-based case management.

However, other data demonstrated an equally urgent need to improve the quality of case management in health facilities. For example, data from a survey conducted in 1989 in 30 health facilities in Nigeria showed that the majority of health workers knew how to diagnose correctly febrile children. However, only 48% administered chloroquine orally, and only 15% advised parents to bring back the patient if no improvement was observed.

While most cases of malaria are treated at home and the majority of deaths attributable to malaria occur outside of health facilities, the low quality of care delivered in health facilities convinced 12 of the 17 participating countries to choose the health facility as their primary focus of concern. The reasons given by the managers for this decision included:

- the need to optimize the use of existing health personnel
- the need to standardize treatment schedules
- the obligation to support and improve health services
- the need to be responsive to communities by improving the quality of health services
- the need to attract greater numbers of clients through improved services

Case management guidelines

Before the workshop, most countries recommended the use of antimalarial drugs such as quinine and amodiaquine to treat cases of suspected chloroquine-resistant malaria. A comparison of the advantages and disadvantages of different antimalarial drugs demanded a reexamination of this policy.

The costs of halofantrine and mefloquine, in spite of their efficacy, are prohibitive for most countries. Quinine has two major disadvantages: the need for multiple doses, which increases the difficulty of compliance, and its relatively high cost. The severe side effects of amodiaquine have led WHO to discourage its use. Sulfadoxine-pyrimethamine (Fansidar®), however, has several advantages: single dose administration, affordability and rarity of side effects. Its efficacy has been demonstrated in field studies in areas of chloroquine resistance. In view of these data, almost all of the program managers recommended a change in policy to sulfadoxine-pyrimethamine as the second-line drug of choice (Table 1).

Table 1
Choices of 17 countries prior to, and at the conclusion of, the workshop on policy development for malaria control of second line drugs for treatment of chloroquine - resistant malaria.

COUNTRY	PRIOR TO WORKSHOP	AT CONCLUSION OF WORKSHOP
1	PRIMAQUINE	S-P
2	Q	S-P
3	A	S-P
4	A	S-P
5	Q	S-P
6	A	Q (SUPPOSITORY)
7	-	S-P
8	-	S-P
9	A	S-P
10	Q	S-P
11	A	S-P
12	-	S-P
13	A	S-P
14	Q	S-P
15	CQ (INJECTION)	S-P
16	-	S-P
17	S-P	S-P

A: AMODIAQUINE CQ: CHLOROQUINE Q: QUININE
S-P: SULFADOXINE-PYRIMETHAMINE

Prevention guidelines

For certain decisions, participants recognized that the necessary data were lacking and identified how they could be obtained. For example, in the Gambia, the use of insecticide-impregnated bednets has resulted in a substantial decrease in childhood mortality⁵. However, before bednets can be promoted in other African countries, their benefits in conditions of higher endemicity must be assessed by controlled field trials of efficacy and effectiveness, as well as cost-benefit analyses.

Conclusion

The Bobo Dioulasso workshop provided program managers with an opportunity to acquire new skills and to apply them immediately in making policy decisions for malaria control. The sharing of experiences among different countries and the use of data from the African region were the basis for decision-making. Each country made these decisions on the basis of their respective circumstances, and program managers identified additional data needed for future policy decisions.

Future Directions

The challenge is to ensure that the process initiated in Bobo-Dioulasso will continue. How can the skills acquired be developed further once the participants return to their respective countries? How can these skills be transferred to other managers? How can other decision-makers be engaged in the consensus-building process of national policy development? And finally, how can the policy setting dynamic for malaria control be sustained over time? National commitment, strong leadership, and continuing support from international partners, such as WHO and CDC, will be needed to meet these challenges. Going beyond malaria, to what extent can the decision-making approach adopted for this regional workshop be applied to other public health programs and to other African countries?

References

1. McGregor IA, Wilson ME, Billewicz WZ. Malaria infection of the placenta in The Gambia, West Africa: Its incidence and relationship to stillbirth, birthweight and placenta weight. *Trans R Soc Trop Med Hyg* 1983;77:232-44
2. Steketee, RW et al. Malaria prevention in pregnancy: The effects of treatment and chemoprophylaxis on placental malaria infection, low birth weight, and fetal, infant, and child survival. ACSI-CCCD Catalogue Number 099-4048, Atlanta, CDC, 1993.
3. Deming MS, Gayibor A, Murphy K, Jones TS, Karsa T. Home treatment of febrile children with antimalarial drugs in Togo. *Bull World Health Organ* 1989;67:695-700
4. Greenwood BM, Bradley AK, Greenwood AM, Byass P, Jammeh K, Marsh K, et al. Mortality and morbidity from malaria among children in a rural area of The Gambia, West Africa. *Trans R Soc Trop Med Hyg* 1987;81:478-86
5. Alonso PL, Lindsay SW, Armstrong JRM, Conteh M, Hill AG, David PH, et al. The effect of insecticide-treated bed nets on mortality of Gambian children. *Lancet* 1991;337: 1499-1502.

A Comprehensive Approach To Improving Malaria Control Program Plans

Kristin Nicholson Saarlus, Joseph F. Naimoli

Introduction

Planning is the second stage of the public-health management approach adopted by the Malaria Initiative. Skills in program planning are needed to execute national malaria control policies and to provide a solid framework for program implementation. This paper will describe how some francophone African ministries of health (MOH), represented by their program managers, collaborated with the U.S. Centers for Disease Control and Prevention (CDC) and the World Health Organization (WHO) to develop national malaria control program plans. To strengthen the planning capacities of program managers, the Malaria Initiative has taken a comprehensive approach that includes training workshops, country-specific technical assistance, and follow-up activities.

Objectives of the Approach

The approach used to improve program plans has four main objectives:

- To identify the needs and priorities of malaria control program managers related to effective planning.
- To engage program managers in learning opportunities that lead to high quality and useful national program plans.
- To promote continuous application of learning and refinement of plans on the job.
- To evaluate planning skills and changes in the quality of national program plans over time.

Four major activities were conducted to meet the objectives: 1) needs assessment, 2) curriculum development, 3) curriculum implementation, and 4) evaluation and follow-up. A brief description and selected results of each activity are presented below.

Description of Activities and Selected Findings

Needs Assessment

The needs and priorities of malaria control program managers were assessed through three activities that occurred between October 1991 and February 1992. These activities included informal discussions, a survey sent to 17 country managers, and a review of 13 national malaria control program plans. This assessment produced several important findings. First, program objectives in current plans are often inadequately defined and do not always address all essential program outcomes and impact. Second, program activities are not comprehensive enough to ensure attainment of the objectives and are not based on the countries' resources and priorities. Third, strategies for monitoring and evaluating the program rarely exist in program plans, and, when present, are often limited to a list of indicators. Few indicators described in the plans are related to the objectives, and many are incompletely formulated. Program managers expressed a need, during the assessment activities, for additional training to refine their planning skills. A regional workshop was suggested as an appropriate first step toward improving malaria control program plans.

Curriculum Development

The curriculum for the workshop was developed through a 1-week consultation in March 1992 and a 3-day meeting immediately before the workshop. The 11 workshop trainers, who attended both activities, included epidemiologists and training specialists from CDC and WHO, and four African malaria control program managers.

During the consultation, a consensus was reached on the purpose of the workshop and the most important planning skills to be learned. The workshop purpose would be to assist managers in developing a preliminary malaria control program plan. The training curriculum would focus on improving the following skills: defining impact and outcome objectives, selecting indicators, and developing plans for program implementation, monitoring, and evaluation. The training team also designed a training schedule, eight lesson plans, and a workshop evaluation plan during this consultation. Interactive training methods that emphasized sharing experiences and making decisions were emphasized when designing the workshop curriculum.

During the three-day meeting, the curriculum was refined and a system was devised for reviewing the curriculum during the workshop. This review system included daily trainers' meetings to discuss progress, and special sessions with each facilitator to revise the training materials.

Curriculum implementation

The trainers implemented the curriculum during a 2-week workshop in Abidjan, Côte d'Ivoire in May 1992. Thirty-five participants from 17 francophone African countries attended (Figure 1).

Participants worked in country teams, which were composed of malaria program managers, directors of community health or major endemic diseases, and other ministry personnel. Learning activities during the workshop provided ample opportunity for participants to practice developing key components of their malaria control plans and to receive feedback from colleagues and trainers. Discussions and interactive exercises took place in small groups, country teams, and plenary sessions. By the end of the workshop, each country team had developed a preliminary program plan.

COUNTRIES PARTICIPATING IN PLANNING WORKSHOP

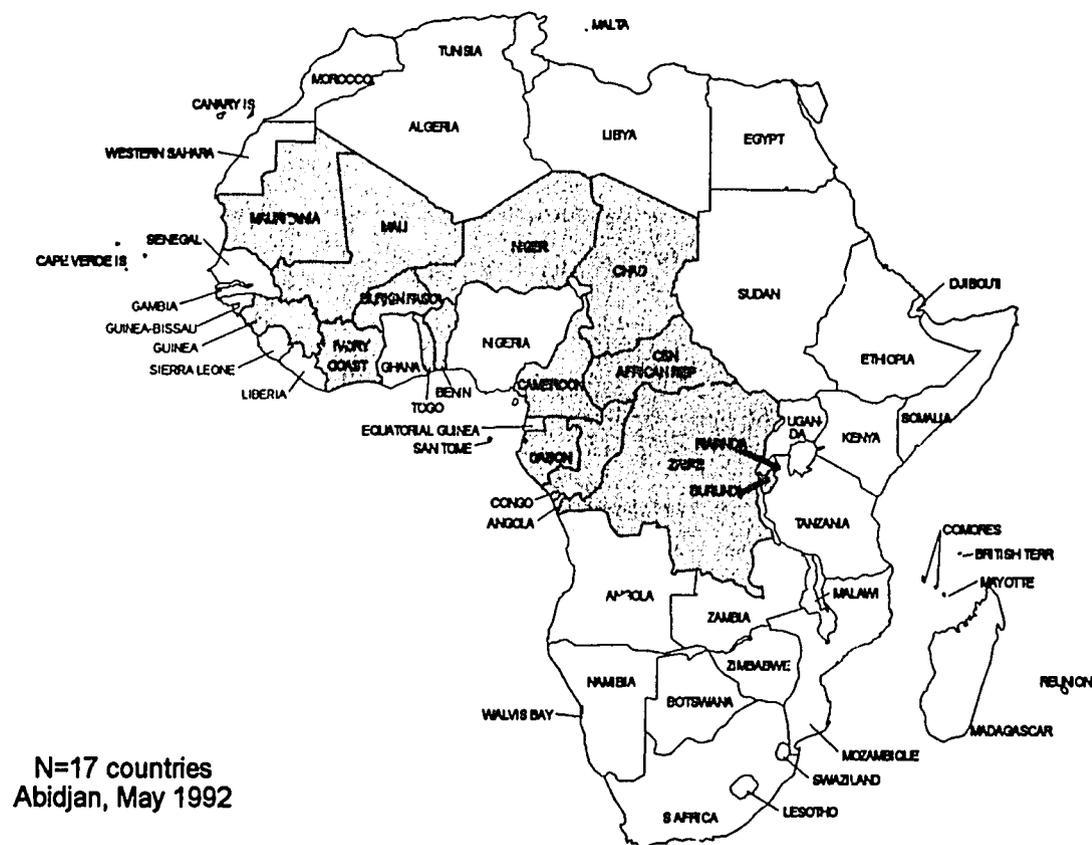


Figure 1

Evaluation and follow-up

Workshop evaluation methods such as large group feedback sessions, focused group discussions, and daily trainers' meetings, assessed participant reactions to the training. Results from these methods were used to make improvements in the implementation of the workshop. A self-administered questionnaire completed by participants at the close of the workshop suggests that program managers were satisfied with the delivery and the design of the curriculum. For example, 85% of the participants agreed that the trainers demonstrated the necessary technical

knowledge to conduct the workshop, and 74% agreed that the trainers demonstrated the necessary skills to be effective trainers. Ninety-seven percent of participants agreed that the organization of the sessions helped them improve their planning skills, and 83% agreed that the collaboration between program directors and managers in a team resulted in the development of a better plan than would have been achieved if they had worked separately.

Immediate changes in the planning skills of participants were evaluated using a standardized checklist developed by the training team. This checklist determined whether each of the key components of the plan were present in the written national program plans. Two independent scorers rated changes by comparing each country's pre-workshop national plan with the draft plan produced at the close of the workshop. All participating countries increased the completeness of their program plans as a result of their involvement in the workshop. For example, among the 17 countries participating in the workshop, the number of countries that had developed objectives for improving case management increased from 5 to 13, and the number whose plans specified indicators for measuring outcome objectives increased from 8 to 17 (Figure 2).

**PRE- AND POST-WORKSHOP
ASSESSMENTS OF THE COMPLETENESS
OF MALARIA CONTROL PLANS**

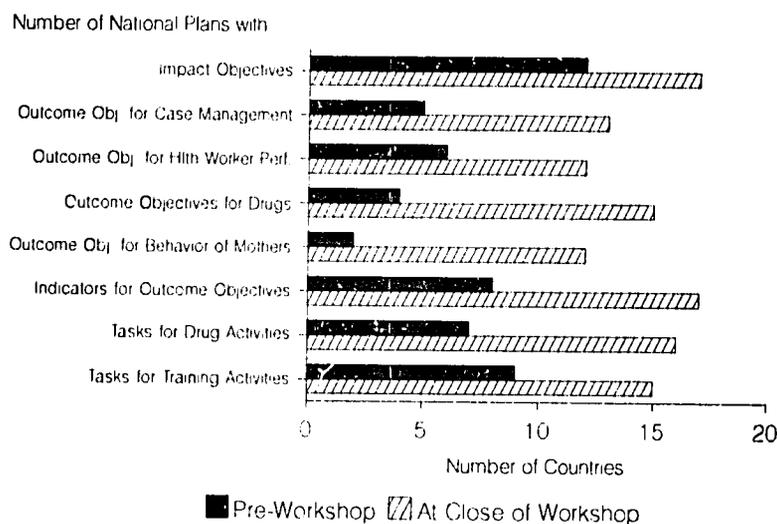


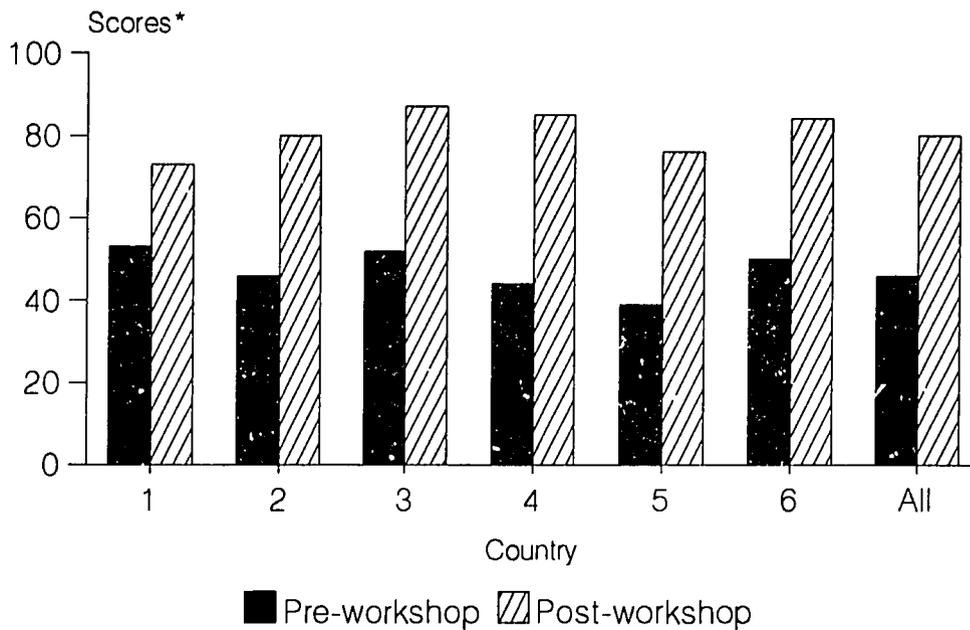
Figure 2

A follow-up survey and site visits to individual countries were conducted after the workshop. To monitor progress, a self-administered questionnaire was sent to each of the 17 participating countries five months after the workshop. Fifteen countries responded. All reported that one or more components of their national program plan had been revised since the workshop, and five had submitted their revised plans to the MOH for approval. The purpose of the site visits was to meet with the participants and other MOH personnel to review and refine the plans prepared during the workshop, and to define the next steps in program implementation. For example, a

visit to Côte d'Ivoire was conducted by representatives from the training team in October 1992 to assist the malaria control program manager in revising the program objectives, modifying the implementation plan, and developing the monitoring and evaluation components of the plan. Means for implementing the plan, primarily in the area of improving supervision of health workers, were discussed among MOH personnel and donors.

After the workshop, several countries revised their national malaria control plans. Improvements in the quality of these plans were evaluated nine months after the workshop using a method based on expert judgements. Ten judges were selected, including program managers, malariologists, and international health program specialists. Each plan was randomly assigned to three judges, ensuring that no judge received the pre- and post-workshop plans for the same country. Scores were based on four broad criteria covering program objectives, indicators, implementation, and overall quality, with a total possible score of 100. Results from the six countries' plans submitted for review indicate that the planning workshop was associated with large gains in plan quality (Figure 3).

QUALITY OF NATIONAL MALARIA CONTROL PLANS AS JUDGED BY EXPERT PANEL (n=6 participating countries)



Scores were based on sub scores in four equally weighted areas. Scores presented here reflect the average score for each plan offered by three independent judges.

Figure 3

Conclusions

Experience gained from applying this approach suggests that malaria control planning can be improved when program managers and international partners work together to achieve shared objectives. Five key factors that contributed to the success of the approach are summarized below.

- The needs and priorities of program managers were determined through a variety of methods and the data collected were used to design an appropriate curriculum.
- A multi-disciplinary training team effectively designed, delivered, and evaluated the workshop curriculum.
- Interactive training methods, work in country teams, and participatory learning exercises allowed program managers to practice planning skills and to receive feedback from colleagues during the workshop.
- Many countries have been supported in the continuous development of their national plans by representatives of the training team. The four activities in the approach — needs assessment, curriculum development, curriculum implementation, and evaluation and follow up — were not isolated events, but linked together in a coordinated and systematic manner, with the full participation of the malaria control program managers.

Future Considerations

Developing high quality program plans for malaria control is a lengthy process. The steps already taken - training program managers in planning, reviewing and revising plans during follow-up visits, and monitoring the progress of program managers in gaining approval from MOHs - are just the beginning. Additional time and funds must be spent in supporting countries in the replanning process and in obtaining and using resources to implement their plans successfully. Continued assistance must be given to program managers in their efforts to modify objectives and activities in response to recent information from field operations and from program evaluations. Planning must be perceived as a dynamic and useful process for improving malaria control programs: planning that is directly linked to policy and that leads to improved program implementation.

The Management of Antimalarial Drugs in The Central African Republic

Dieudonné Yazipo, James C. Setzer, Stephen C. Redd

Introduction

In 1986, the continuing health, social and economic problems posed by malaria led the Ministry of Health of the Central African Republic (C.A.R.) to plan and implement a national malaria control program. The goal of the program is to reduce malaria-related morbidity and mortality among children less than five years of age and pregnant women. Case management for children and chemoprophylaxis for pregnant women are the two priority interventions being applied to achieve these goals.

Recognizing the fundamental role that antimalarial drugs play in the strategy to combat malaria, program managers included a module on drug management in the curriculum for training health workers in proper case management for febrile children and chemoprophylaxis for pregnant women. During their training, health workers were taught how to estimate the antimalarial drug requirements using population-based estimates of need among different target groups. The training program also addressed drug procurement by health facilities and methods to monitor the use of antimalarial drugs at each facility, particularly chloroquine supplied by the national malaria control program.¹

Despite this major effort to train health workers, program implementation and impact have been limited by shortages of antimalarial drugs in health facilities, a situation that has become increasingly severe. Because of this problem, in 1992, the Ministry of Health, in collaboration with the U.S. Centers for Disease Control and Prevention (CDC), analyzed the availability and management of antimalarial drugs in the C.A.R. This analysis had two objectives. The first was to identify weaknesses in the current management of antimalarials; the second was to propose solutions to improve their availability.

Methodology

Three major concerns of the Ministry of Health were addressed in this analysis: antimalarial drug management, financing, and coordination with the essential drugs policy of the C.A.R. The analysis was restricted to one of the five health regions of the country and conducted during one week in October 1992. A six-person team, four from the Department of Preventive Medicine and Major Endemic Diseases of the Ministry of Health, and two from the CDC, carried out the analysis. Total local costs incurred by the Ministry of Health to implement this analysis were \$780 US.

The three methods used in the analysis were review of records, interviews, and observations:

- *Document and record review.* This activity involved an examination of written documents, including the national policy statement, the health worker training manual,¹ reports on antimalarial procurement and distribution, reports of drug management studies undertaken in the C.A.R., and facility stock and inventory records.
- *Interviews.* Discussions were conducted with health facility supervisors and pharmacists, and representatives of selected donor agencies.
- *Observations.* Observations of health worker practices were carried out in five health facilities: two district hospitals, two health centers, and a health post. Observations were made in outpatient consultation areas and the pharmacies of these facilities.

Findings

The major findings of the analysis are presented according to each of the major concerns of the Ministry of Health.

The Management of Antimalarial Drugs

There were four major findings. First, the analysis confirmed anecdotal information indicating serious and widespread shortages of antimalarial drugs in health facilities. One prior study undertaken in the C.A.R. revealed that among 87 health facilities, only 60% had chloroquine in stock at the time of the survey, and only 30% had quinine in stock.

Second, chloroquine was, by far, the most readily available of all antimalarial drugs in health facilities. Sulfadoxine-pyrimethamine, the second-line drug of choice in the treatment of malaria according to national policy in the C.A.R., was not available in the majority of health facilities.

Third, the analysis revealed that supplies of drugs at health facilities reflect their availability at the central level. The needs estimated at health facilities, made according to national program guidelines, are ignored at the central level where decisions are made about quantities of antimalarial drugs to be distributed to health facilities. The decision-making process is influenced by the stocks at the central level, which are clearly insufficient to address the needs of the priority target populations.

Finally, the analysis indicated that the antimalarial drugs supplied by the national program have supply, stock, and inventory systems that are managed separately from other drugs at health facility pharmacies.

Financing of Antimalarials

There were two major findings in this area.

Virtually all antimalarial drugs used at health facilities are supplied by external donors. For example, 95% of the chloroquine and 73% of the quinine used in health facilities are financed by external assistance, principally through the United States Agency for International Development (A.I.D.) and the French Cooperation Agency (F.A.C.). The C.A.R. government purchases only 4% of the chloroquine available in the country. The role played by other sources in the financing of antimalarial drug procurement in the C.A.R. (e.g., private pharmacies, gifts made by private voluntary organizations to health facilities) could not be estimated due to inadequate documentation.

Second, the analysis confirmed that antimalarials, when available at public health facilities, are provided to patients free of charge as required by the national malaria control policy.

Antimalarials and the Essential Drugs Program

Many donors, including the United Nations Children's Fund (UNICEF), the United Nations Development Program (UNDP), the African Development Bank, A.I.D., and the World Health Organization (WHO) are actively involved in helping the C.A.R. develop an essential drugs program. These donors are supporting a variety of geographically restricted demonstration projects, including one focusing on the "Bamako Initiative", and others on drug procurement, health worker training and evaluation, and cost recovery. However, these efforts are not coordinated. Furthermore, while laws exist concerning charges, duties and cost recovery for essential drugs, this legislation is not being applied because of the absence of official authorizing texts.

Conclusion

Three major conclusions can be drawn from this analysis. First, the highly verticalized system of antimalarial drug management currently in place is not being implemented effectively and cannot be implemented as currently designed. Second, if external assistance for drug procurement were to be withdrawn from the C.A.R., the activities of the malaria control program would come close to a complete halt. External assistance provides 95% of the chloroquine and 73% of the quinine in a system in which cost recovery is not being implemented, and ministry resources are insufficient to cover essential drug costs. Third, the Ministry of Health recognizes that the drug management system requires prompt attention and is making an effort, with the support of various donors, to improve the availability of essential drugs throughout the country. Unfortunately, up to now, these various efforts to improve drug availability have not been coordinated in a systematic manner.

Future Perspectives

To improve the management of essential drugs in the C.A.R., several actions must be taken. The different efforts currently underway in the C.A.R. to implement primary health care must be better coordinated, particularly the management of essential drugs. Financing of essential drugs must be matched with respect to the expressed and real needs of the target populations to be served.² Antimalarial drug management must be integrated into a national system of essential drug management with oversight by the Ministry of Health. And finally, a policy of community financing, at reasonable cost to the population, must be applied in the field.³ The funds generated by such a system should be used to ensure the availability of drugs at the local level.

Lessons Learned

In conducting this analysis, several valuable lessons were learned. This analysis was a rapid and inexpensive means of identifying key problems in the management of essential drugs that the Ministry of Health can now address in a timely manner. It confirmed that the regular availability of antimalarial drugs is fundamental to the effective implementation of case management programs in primary health care⁴. Finally, it drew attention to the need to understand what is actually occurring in the field and not to assume that written policy is necessarily or correctly translated into action in the field.

References

1. Ministry of Health, Central African Republic. Training manual for malaria control, 1991.
2. Foster S. Supply and use of essential drugs in sub-Saharan Africa: Some issues and possible solutions. *Soc Sci Med* 1991;32:1201-18.
3. Litvak JI, Shepard DS, Quick JD. Setting the price of essential drugs: necessity and affordability. *Lancet* 1989;2:376-9.
4. Foster SD. Pricing, distribution, and use of antimalarial drugs. *Bull World Health Organ* 1991;69:349-63.

Health Worker Supervision in Côte D'Ivoire: A Needs Assessment

Joseph Niangue, Joseph F. Naimoli, Mark D. LaPointe

Introduction

Health worker supervision is an essential component of primary health care programs in developing countries¹. Supervision's important role in ensuring the delivery of high quality health services is becoming increasingly recognized, as the limitations of *training alone* for ensuring quality care become more apparent². For example, an observational study of patient management for selected childhood diseases in Côte d'Ivoire in 1990 indicated several deficiencies in health worker practices in rural health facilities³. In response to these findings a multi-staged training program was carried out to improve health worker performance³. A post-training evaluation demonstrated that training was associated with increased skills among health workers (Figure 1);³ however, training was insufficient to address all the inadequacies in case management identified in the baseline survey. Only

TREATMENT AND INFORMATION GIVEN IN RURAL FACILITIES TO MOTHERS OF FEBRILE CHILDREN, BY PARTICIPATION IN TRAINING

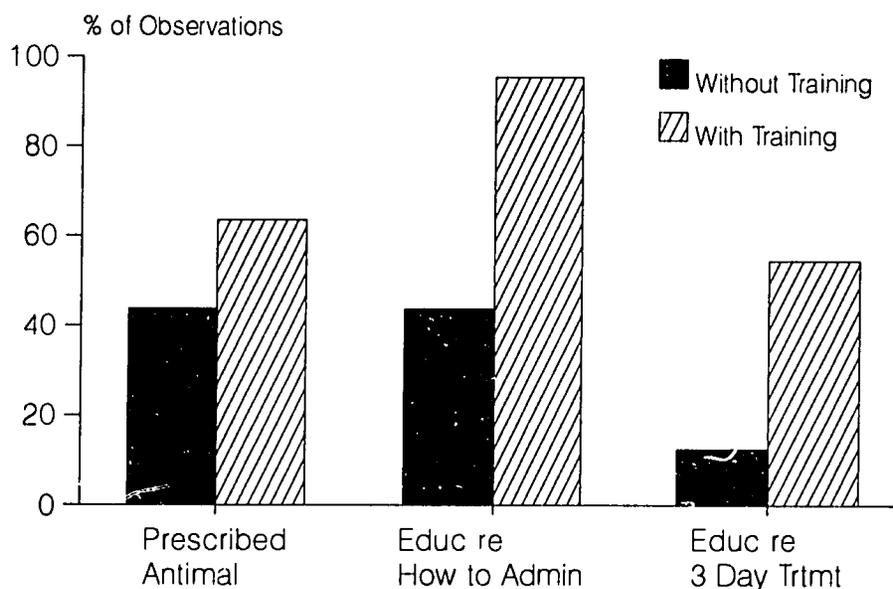


Figure 1

Côte d'Ivoire, 1991
38 observations in 15 facilities

26% of all facilities sampled in the post-training had either chloroquine tablets or syrup in stock³ (Figure 2).

Availability of Chloroquine in Public Health Facilities in Côte d'Ivoire, 1991

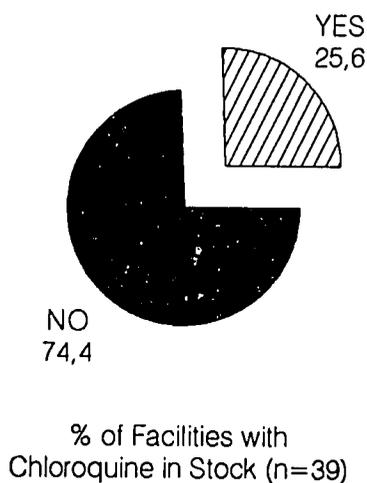


Figure 2

Experience from the African Child Survival Initiative - Combatting Childhood Communicable Diseases (ACSI-CCCD) Project and other child survival programs in Africa suggests that improved skills gained through discrete training must be continuously monitored and reinforced on-the-job, and that health workers must have access to a regular supply of medicines, equipment, supplies and other basic material to perform adequately². Supervision is a promising strategy for providing this much needed support to health personnel.

Despite recognition by ministries of health and international assistance partners of supervision's potential contribution to the success of primary health care programs, few countries in Africa have been able to mount and maintain a supervisory program that can meet consistently the needs of health workers. There are numerous difficulties in implementing supervision in primary health care systems⁴; however, very little is known about what constitutes an effective strategy. Apart from work supported by the U.S.

Agency for International Development (U.S.A.I.D.) in several African countries^{5,6}, there have been few systematic attempts to plan, implement and evaluate a supervisory system.

Purpose of the Assessment

In October 1992, Côte d'Ivoire's Ministry of Health took an important first step towards improving supervision by conducting a needs assessment. The purpose of this assessment was to describe the system as it currently functions, to identify its strengths and weaknesses, and to determine possible corrective actions. The findings of the review, based on self-reports of supervisors from different levels of the health system, were to provide a basis for more focused observational studies that would eventually lead to the design of a promising long-term supervision strategy responsive to the needs of those expected to carry it out, and suitable for field evaluation. Recent revisions in the national malaria control policy (1991) and plan (1992) in Côte d'Ivoire provided the stimulus to reexamine the potential for improving health workers' performance in managing febrile children. The Ministry hoped that the findings from this assessment could be used to make recommendations for improving health worker performance across a broad spectrum of primary health care programs.

Methods

The Ministry conducted this needs assessment in collaboration with the U.S. Centers for Disease Control and Prevention (CDC). Representatives of the ministry's Department of Community Health and CDC's International Health Program Office led a series of focused group discussions with supervisors from national, regional, district and rural levels of the health care system. Nine coordinators of national primary health care programs and the director of community health participated in the national level discussions. The directors of two of the ten health regions in Côte d'Ivoire, and the chief medical officers from seven of the country's 26 rural health sectors participated in the regional/district level discussions. A "best case scenario" approach was used to select the sector supervisors: they were chosen on the basis of their dynamism as recognized by the Ministry of Health, and their representation of the different malaria epidemiologic ecotypes of Côte d'Ivoire. Fifteen nurse-supervisors from one of the seven rural health sectors represented in the regional/district discussions participated in the rural-level discussions. One hygiene assistant and one Peace Corps Volunteer from the same district also joined these work sessions. A total of 36 health workers from all levels of the system were included in the assessment.

The discussion facilitators from the ministry and CDC convened three meetings with supervisors at three different locations in the country during the period 12-20 October 1993: the capital (Abidjan), a regional health office (Yamoussoukro), and a rural health sector office (Adzopé). The major topics that were addressed during these discussions were 1) current supervisory behavior, 2) perceptions of the adequacy and effectiveness of supervision, 3) barriers to the implementation of supervision, and 4) possible strategies for overcoming these barriers. The facilitators conducted plenary and small group discussions

with the aid of a discussion guide. Information generated during the discussions was recorded by a facilitator on large sheets of newsprint that were observable by all participants. At the close of each work session, facilitators synthesized the information and made recommendations concerning further actions to be taken concerning potential improvements in supervision. A recorder from each meeting produced a final report.

Findings

The results of the discussions consist of a summary description of the range of strengths, weakness, concerns and suggestions consolidated from the different meetings, according to four major themes that emerged during the collection and the analysis of the information. A summary of the major findings from the discussions with central-and sector-level supervisors follows. Each theme and the corresponding findings are presented below.

Theme 1: The context of supervision: the health structure, resources and past experience

Health structure

The recently drafted national health policy of Côte d'Ivoire provides a favorable climate for strengthening health worker supervision. The policy, which is not yet fully operational, promotes the decentralization of health services and the reinforcement of ten regional health teams. Currently, 26 rural health sector teams, each with a chief medical officer, supervise health workers throughout the country. Under the new policy, 50 health department teams will be established to more efficiently address the needs of health workers at all levels in the system. An administrative plan to carry out the new policy has been completed, and the responsibilities of regional supervisors have been drafted. Currently, a general hospital, with a chief medical officer who is independent of the sector medical officer, is functioning in each of the departments. Under the new policy, the chief hospital medical officer will work more closely with the department-level supervisory teams, and is expected to join the team during visits to rural health facilities in the department.

Resources

Material, financial and human resources in Côte d'Ivoire also favor efforts to strengthen supervision. For example, in the seven rural health sectors represented in the discussions, an average of six vehicles were available in each sector to carry out supervision, and telephones were present and functioning in all sectors and departmental hospitals. The chief medical officers also reported adequate road conditions for conducting supervision. Each sector team also administers a budget of between 8 and 16 million Francs CFA (approximately US \$28,000-57,000), from which funds are disbursed to maintain and repair vehicles, and purchase fuel. The average fuel cost for a complete supervisory tour of an average of 39 health facilities in each sector is approximately \$US 324.00. Funds in the budget cannot be used, however, for per diem support to supervisors during field visits.

Past experience

Finally, there is a strong tradition of mobile supervision in Côte d'Ivoire. This tradition began in the early 1980s, and has continued to the present. The seven chief medical officers from the sectors estimated that they spend approximately two and one-half to three weeks of each month on the road visiting health workers. The common practice of a supervisory visit is a sound basis upon which to build a more robust supervisory system.

Theme 2: Supervisory planning

The central level of the ministry of health currently issues directives to the rural health sector teams concerning the frequency and timing of mobile supervisory visits. Sector teams are expected to visit each health facility (average number of 39 per sector) once a month. Based on estimated supervisory visits conducted over the 6-month period preceding the assessment, most supervisors reported being able to visit no more than about 60% of their facilities each month. There is little systematic planning of supervision in the health sectors. Although some supervisors do have schedules of planned visits for health facilities, these schedules are often not respected, and do not take into account varying performance levels in facilities as the basis for planning needed supervision. All supervisors from the rural health sectors who participated in the discussions expressed a particular interest in improving their planning skills and requested additional training in this area of supervision.

Theme 3: Performance assessment

Although the Ministry of Health has developed job titles and major areas of responsibility for the different levels of personnel in the health system, the tasks of supervisors and health workers have not been clearly enough defined to permit the establishment of performance standards and indicators of successful performance. Consequently, health workers and supervisors lack precise information about what is expected of them and how their performance is to be judged.

This lack of precision has several important implications for the current practice of supervision. Guidelines or instruments that supervisors can use on a routine basis to assess the performance of their personnel cannot be developed, which makes objective, observation-based assessments of performance difficult to carry out. Although health worker performance assessment tools were developed in 1990 as part of the facility-based survey described earlier, these instruments have not been integrated into the routine supervisory system. Supervisors report that they observe health workers as they consult with patients; however, there is no set of agreed upon minimal observations to be routinely applied during a supervisory visit. Currently, documentation of supervisory visits is limited.

As a sign of the importance it affords to the assessment of health worker performance, the Ministry of Health recently enlisted the aid of the World Bank in developing precise job

descriptions for nurses and midwives. During the needs assessment, supervisors from the sectors recommended that supervisory tools be developed to guide their activities. They suggested that a committee composed of health workers from various levels of the health care system be convened to complete this task.

Theme 4: Performance improvement

There appears to be great variance in the nature and quality of supervisory visits in Côte d'Ivoire. When presented with a list of nine behaviors associated with a quality supervisory visit derived from the literature on supervision in developing countries, central- and sector-level supervisors varied widely in how these behaviors should be translated into action. Following discussion, most supervisors agreed that these behaviors were only partially practiced during a supervisory visit. Supervisors expressed a particular interest in additional training in the methods and techniques of supervision that can enhance their performance.

Future Perspectives

Supervision as currently practiced in Côte d'Ivoire is inadequate; nevertheless, certain conditions are in place to improve the supervisory system significantly. What future actions does the Ministry of Health propose? There are several. Based on the findings of this assessment, there is an urgent need to develop an operational model of supervision relevant to conditions in Côte d'Ivoire that incorporates planning, performance assessment and performance improvement components. From this model, standards can be defined that permit adequate assessment of performance, and indicators developed to permit an evaluation of the quality of supervision. An observation-based survey of actual supervisor performance must be conducted, and the data used as a baseline against which to measure the effects of an eventual intervention to improve the skills of supervisors. In collaboration with supervisors and health workers, the Ministry must identify the factors that may explain possible discrepancies between desired and actual performance as indicated by the results of the survey, and propose realistic and feasible solutions to these problems. Once these possible solutions have been identified, a practical supervisory intervention must be developed, as well as tools and instruments that can be used routinely to assess performance and facilitate quality improvements. The interventions must then be applied in a targeted area of the country. The effects of the intervention on supervisor performance can then be evaluated. The results can be used to refine the operational model for implementation in other areas of the country.

Conclusion

This type of exploratory assessment merits consideration by other countries interested in improving supervision. It can be carried out by most ministries of health at a cost well within their means, and the methodology is straightforward and practical. Another advantage is that

the results are immediately available. Perhaps most importantly, those most able to act on the results are engaged, from the start, in identifying and sharing both problems and solutions with colleagues.

References

1. World Health Organization. On being in charge. A guide for middle-level management in primary health care. Geneva: WHO, 1980.
2. Bryce J, Cutts F, Naimoli JF, Beesley M. What have teachers learnt? *The Lancet* 1993; 342: 160-1.
3. Ministère de la Santé et de la Protection Sociale, République de Côte d'Ivoire. Evaluation de l'impact des formations et des besoins en formation des personnels de santé. Rapport Final. Abidjan: Ministère de la Santé de de la Protection Sociale, 1991.
4. Valadez J, Vargas W, Diprete L. Supervision of primary health care in Costa Rica: time well spent? *Health Policy and Planning*; 5:118-25
5. Center for Human Services. Primary Health Care Operations Research Project (PRICOR). Primary Health Care Thesaurus. Chevy Chase: PRICOR, 1988.
6. Center for Human Services. Examining the quality of supervision among different levels of supervision in Senegal Ministry of Public Health: findings from diarrhea case management assessment. The PRICOR Child Survival Report, July 1990.

Strengthening Communication Between Health Workers And Mothers

Lardja Sanwogou, Eve M. Nagler, Kathleen A. Parker, Eve M. Lackritz, A. Judith Chwalow, Joseph F. Naimoli

Introduction

One of the principal strategies for preventing the deaths of children from malaria is the prompt and effective treatment of fever with antimalarial drugs¹. To prevent a child with malaria from dying, a series of events must take place. The mother of a febrile child must recognize the illness and treat the patient at home or bring the child to a health center. If the mother brings the child to a health center, the health worker must correctly diagnose, treat, and refer the patient, as well as educate the mother about follow-up care at home. The mother must then administer the treatment in order for her child to become well.

This paper will focus on a vital link in the case management chain—the education of mothers during the management of children presenting at health facilities with a febrile illness—and how strengthening the communication between health workers and mothers can reinforce the management of febrile children.

Background

Recent experience from child survival programs in Africa suggests that health worker training may not have devoted sufficient attention to the educational aspect of case management. In studies conducted in several countries that participated in the African Child Survival Initiative - Combatting Childhood Communicable Diseases Project (ACSI-CCCD), serious deficiencies in the patient education provided by health workers have been documented.

In 1990, 86 observations were made in 29 health facilities in Côte d'Ivoire. Only 6 of 10 mothers of children diagnosed with fever were told by the health worker how to administer the medicine prescribed for their child. Fewer than half the women were told the conditions under which they should return to the health center with the child² (Figure 1).

In a study in Nigeria in 1988, 55 exit interviews were conducted

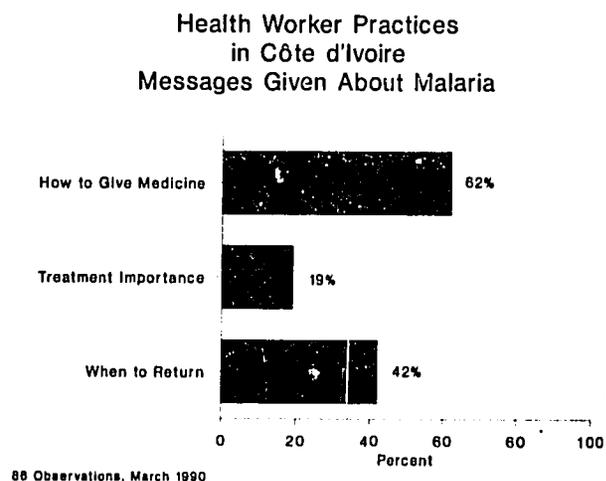


Figure 1

with mothers whose children had fever on the day they came to the health center. Only 27% of the mothers reported that they knew what to do for their child's fever once they returned home. Roughly 1 out of 4 women reported being told by the health worker to return in 3 days if their child still had a fever³ (Figure 2).

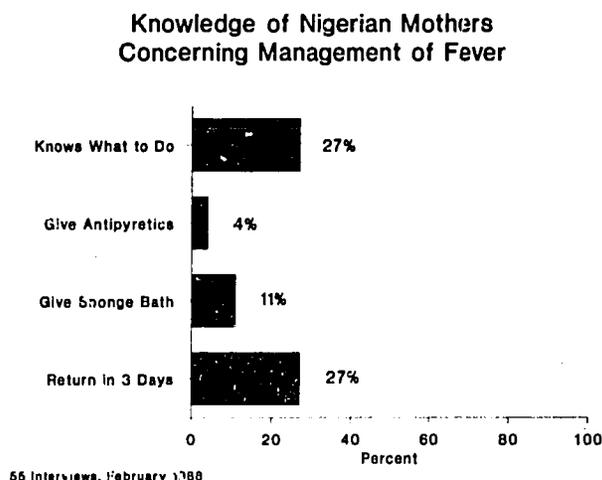


Figure 2

There are many possible reasons for the lack of patient education provided during case management.

For example, health workers' job descriptions frequently do not include education of patients as an explicit and expected task. Many health workers have not had the opportunity to develop their skills in patient education during their professional training as doctors or nurses. Since patient education may have little, if any, immediate, tangible benefits, health workers are not encouraged to routinely provide this service. Consequently, in many instances, mothers leave health centers uninformed and unprepared to continue appropriate treatment in the home.

What to do?

To reinforce the educational aspect of case management, participants in the Malaria Initiative embarked on an activity designed to improve the communication skills of health workers. In this spirit, a regional consultation on patient education, with health educators, epidemiologists, and malaria program managers in attendance, was held from January 25 to February 5, 1993 in Brazzaville, Congo at the World Health Organization Regional Office for Africa (WHO/AFRO). Representatives from five African countries (Central African Republic, Congo, Côte d'Ivoire, Madagascar, and Zaire) and from the World Health Organization and the Centers for Disease Control and Prevention (CDC) participated in this consultation.

Objectives

The consultation had two objectives: 1) to develop in the African Region a pool of facilitators skilled in patient education techniques and capable of designing, implementing, and evaluating health worker training programs that include skill development in patient education; and 2) to produce guidelines for developing a training program to improve health worker performance in patient education for use at the country and intercountry levels.

The Approach

Participants in the consultation identified five components of an approach to improve the patient education component of malaria case management.

- ***Compliance***
The ultimate goal of patient education was defined as improving mothers' compliance with the treatment and follow-up recommended by the health worker. A survey, conducted in 1984 in Togo, found that 70% of the dosages given by mothers to treat febrile children were inadequate because less than 10 milligrams of chloroquine per kilogram were given during the first 24 hours.¹
- ***Interpersonal Communication***
To achieve greater compliance, the interpersonal communication between the health worker and the mother during a clinical consultation for febrile illness needed to be improved. Research has demonstrated that the communication of explicit and precise instructions to the patient promotes compliance with the recommended treatment. Patient knowledge of the recommended regimen was also found to be correlated with compliance.⁴
- ***Health Worker Training***
Health worker training, using "modeling" of expected behaviors as the primary training method, was adopted as the means of improving interpersonal communication skills during case management.
- ***Skills Improvement***
Participants in the consultation adopted the philosophy that "No one can train someone to do something that they haven't done themselves". As a result, participants spent over 60% of the consultation time in health centers practicing the communication behaviors and the training skills they would need to demonstrate as trainers.
- ***Training of Trainers***
Training materials need to be developed and distributed for in-country or inter-country training of trainers.

METHODS

A variety of methods were used during the consultation.

- ***Situation Analysis***

A situation analysis of case management practices was conducted in four health centers in Brazzaville. Participants observed health workers interacting with mothers and identified deficiencies in the patient education provided during case management. Exit interviews with mothers were conducted by the participants to determine what the mothers had learned through their contact with the health workers.

- ***Training Program***

Based on the data collected during the situation analysis, a health worker training program in patient education was developed and implemented in the health centers.

- ***Evaluation***

After the training, participants conducted an evaluation. They observed health workers interact with mothers and conducted exit interviews with the mothers to determine their knowledge of the treatment protocol and advice given by the health workers.

- ***Guidelines***

Based on this experience, participants developed guidelines that they could use to assist countries in the design, implementation, and evaluation of training programs to reinforce patient education during case management.

Results

- ***Situation Analysis***

The situation analysis uncovered several problems that needed to be addressed in the design of the health worker training program. For example:

Mothers who entered the health centers were not greeted or invited to sit. Many remained standing during the entire consultation. Examination tables were filled with health workers' purses, paraphernalia, and other personal effects. Although health workers wrote prescriptions for three days of chloroquine according to Congo's national malaria policy, a poster on the wall advertising *Fansimef*[®] (a combination of sulfadoxine/pyrimethamine and mefloquine) was inconsistent with the national policy since it recommended that one dose of *Fansimef*[®] was best! Actual case management practices of febrile children varied among health workers in the same clinic. The national policy guidelines were not followed consistently by all health workers observed.

- ***Training Program***

The data collected during the situation analysis were used to develop educational messages and performance standards that were incorporated into the training program. For example:

As mothers came to the health center, they should be greeted by the health workers and offered a chair. Using the modeling technique, participants showed health workers how to explain the child's vital signs to the mother.

Participants demonstrated the use of the examination table in conducting a physical examination of a febrile child. The important messages to be communicated to the child's mother during the examination were also identified. Health workers were shown how to verify that the mother clearly understood the recommended treatment for her child by asking the mother to explain and to demonstrate how she would treat the child once she returned home.

- ***Evaluation***

After the training, the participants informally evaluated health worker performance and mothers' knowledge. All the participants agreed that the quality of patient education provided by trained health workers and the knowledge gained by the mothers had improved considerably over pre-training levels.

- ***Guidelines***

At the end of the consultation, participants developed 1) guidelines for designing national patient education training programs, and 2) instruments for the situation analysis and post-training evaluation. A report of the consultation was also drafted. Once finalized, this report will be disseminated to all World Health Organization/AFRO member states.

Conclusions

This experience in the Congo highlighted that 1) communication between health workers and mothers is an on-going process throughout case management and is vital to the diagnosis, treatment, and referral of a febrile child, 2) modeling can be used as a training technique by personnel at all levels to promote the habit of combining an educational message with each clinical step— from greeting the child's mother and explaining the diagnosis to verifying her comprehension of the treatment and follow-up care required, 3) patient education is an important component of case management and should be integrated into the training of all health workers.

Recommendations

In the words of Dr. Monekosso, Regional Director for WHO/AFRO, "malaria will still be with us 100 year from now"⁵. We must act now to reduce the number of deaths that will result from malaria. It is recommended that 1) a multidisciplinary team of trainers, drawn from the participants in this consultation, assist one or more African countries in designing and implementing a strategy to reinforce the patient education component of malaria case management, 2) the patient education component of all malaria training programs sponsored by the World Health Organization and other donors be strengthened, and 3) for malaria and any other disease, the advice given to mothers by health workers, pharmacists, the mass media, and other sources be consistent with national policies and program plans.

References

1. Deming MS, Gayibor A, Murphy K, Jones TS, Karsa T. Home treatment of febrile children with antimalarial drugs in Togo. *Bull World Health Organ* 1989;67:695-700.
2. National Institute of Public Health, Côte d'Ivoire. Training field assessment survey May 1990, Côte d'Ivoire, Final Report. Unpublished document. 1990
3. Kinzie BS. Training and supervision needs assessment of Niger State health facilities, Niger State, Nigeria. Unpublished master's thesis. 1988
4. Garrity TF. Medical compliance and the clinician-patient relationship: A review. *Soc Sci Med*, 1981;15E:215-22.
5. Whiteman K. Strategies on malaria. *West Africa* 1992- 9-15 November; 3921:1991-2.

Developing Skills For The Evaluation Of Malaria Control Programs

Kalenga Mbudi Paluku, Phuc Nguyen-Dinh, El Hadi Benzerroug, Jennifer Bryce

Introduction and Approach

Program evaluation in public health can be defined as the systematic collection and use of data to improve health programs and guide the allocation of program resources^{1,2}.

Evaluation of malaria control programs should allow program managers to assess progress towards defined objectives and to make needed operational adjustments. The Malaria Initiative has attached particular importance to the improvement of program evaluation skills among managers. Some of the methods used to accomplish this goal, and their results, are described here.

In all national malaria control program evaluations, the emphasis should be on the use of results to plan and improve programs, sometimes referred to as producing "information for action"³. Evaluation plans and activities must therefore be designed to provide information that is:

- timely, i.e., available prior to major program decisions, program reviews, or planning exercises;
- relevant, i.e., directly related to program management and data needs; and
- decentralized, i.e., whenever possible, providing useful information for program improvement at all levels of the health system.

At the national program level, evaluation consists of a least four interrelated activities:

- *implementation evaluation*: to monitor the process of program implementation, to ensure that activities are carried out as planned, and to address operational problems in a timely manner.* Routine methods for implementation evaluation should be developed or maintained, where possible in collaboration with other public health programs.

* This type of evaluation has also been called "process evaluation".

- *effectiveness evaluation:* to document progress toward the achievement of program objectives, including anticipated changes in knowledge, behaviors, or systems (outcome objectives) and health status (impact objectives). *The identification and use of program indicators is one popular approach to effectiveness evaluation⁴. For malaria control programs, outcomes include clinical and facility management, the human and material resources available in health facilities, and the compliance and home disease management behaviors of patients.
- *operational research:* to answer evaluation research questions tied to specific interventions or services. This research can include cost studies, formative research designed to improve project design, and evaluations of intervention efficacy or effectiveness that require research designs more rigorous than the tracking of indicators. Critically important operational research studies for malaria include the efficacy of insecticide-impregnated bednets, chemoprophylaxis in pregnant women, and studies of drug and insecticide resistance patterns.
- *periodic program reviews:* to bring together the information collected through other evaluation activities as a basis for replanning, and to conduct analytic assessment of broader program aspects such as the quality of the policy, the appropriateness of the interventions, and management concerns in the work plan. The frequency of program reviews may vary from annually to every three years, based on country needs.

Malaria control programs have been evaluated using all of these approaches in the past although with little uniformity in evaluation methods or measures. The establishment of a more uniform approach to the review and evaluation of malaria control programs should contribute to program development, yet allow national and regional variation. A core set of standard methods and measures might provide a starting point for program managers to improve the quality of information collected about their programs. The development of uniform guidelines will also increase data consistency, enhance the comparability of evaluation results over time and across geographic boundaries, and thus permit the sharing of valuable experience.

Under the Malaria Initiative, program managers from participating countries have made progress toward the development of uniform guidelines for the evaluation of malaria control programs in Africa. During the workshop on Planning and Management for Malaria Control (Abidjan, Côte d'Ivoire, May 1992), program managers shared their experiences— and frustrations—in carrying out program evaluation. They then outlined a systematic process that would result in a set of practical guidelines for the evaluation of their control programs.

* The boundary between implementation evaluation and effectiveness evaluation is not always clearcut, as the outcomes of some activities (e.g., proportion of health workers trained) may be considered as process indicators for other activities (e.g., proportion of health workers who treat fever correctly).

Results

The most important results of evaluation activities to date include: 1) the development of a conceptual model of a malaria control program to serve as the foundation for program evaluation; 2) the identification of a preliminary set of indicators and supporting methods; and 3) the improvement of program evaluation skills among program managers.

The conceptual model. In evaluation, one of the major difficulties is deciding what should and can be evaluated. More precisely, what aspects of the program should be the focus of evaluation efforts in order to support decision making about program efficacy and effectiveness? A conceptual model of malaria control programs can help address these questions (Figure 1).

Conceptual Model of Malaria Control Programs

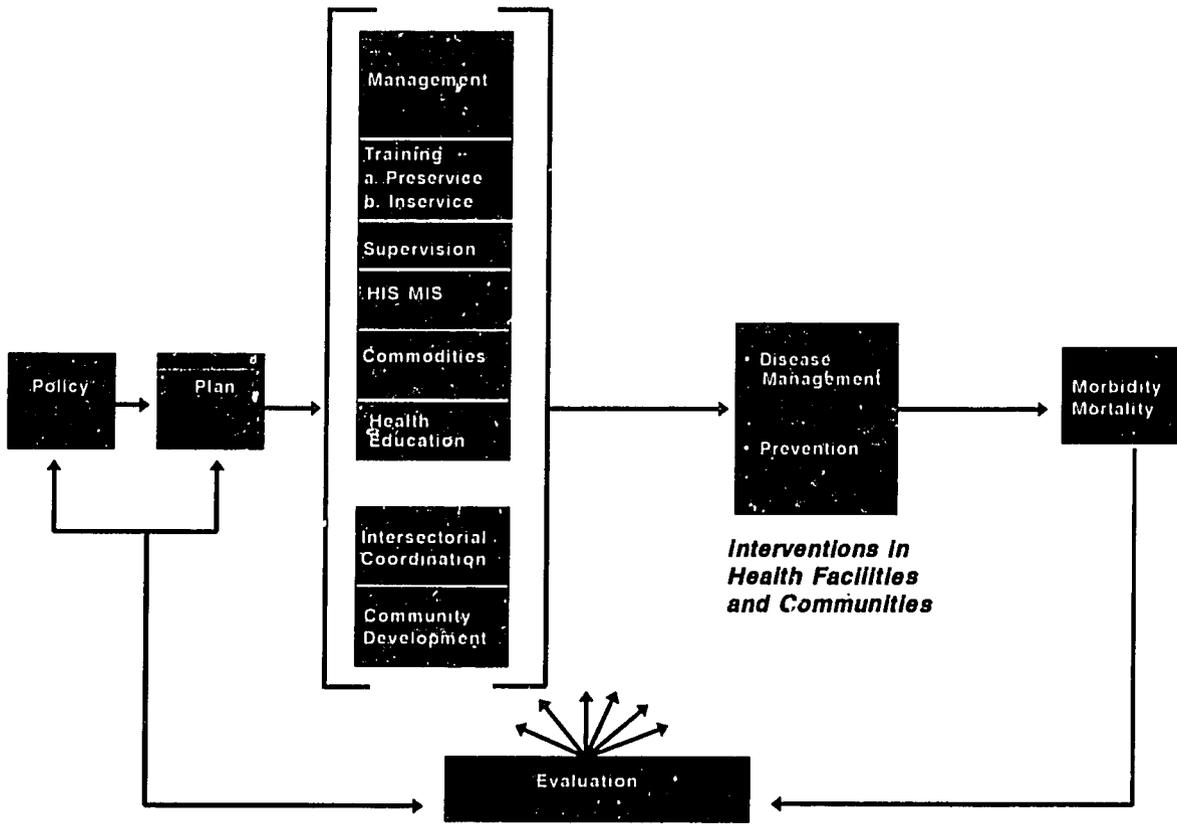


Figure 1

In the model, all programs should begin with a sound policy and program plan. Evaluation has to begin here: managers must ensure that the malaria control policy is technically correct, comprehensive, and precise, and that the program plan is coherent and sufficiently detailed to guide program implementation. Strong policies and plans can support the implementation of program activities within both the health system and the community, which in turn result in improvements in the two major interventions in malaria control, case management and prevention. Finally, high quality case management and effective prevention activities lead to decreases in mortality and morbidity.

Identification of indicators. Indicators are quantified measurements that can be repeated over time to track progress toward the achievement of objectives. Selection of indicators should be based on their 1) validity, defined as the extent to which the indicator is a true and accurate measure of the phenomenon under study;^{5,6} 2) reliability, defined as the extent to which indicator measurements are consistent and dependable across applications or over time;⁶ 3) ability to detect change within a reasonable time period and as a result of successful program implementation; 4) ability to produce data that can be easily interpreted; and 5) usefulness in guiding program change. In addition, only those indicators that can be measured with available program resources should be selected.

The focus of most malaria control program evaluations to date has been mortality and morbidity. Managers reported that these impact indicators may not always reflect progress in program implementation because of a lack of uniformity in the case definition of malaria, and because most patients suffering from malaria do not seek care in health facilities⁷. On the other hand, they reported that indicators of program process and outcomes can be measured in a more reliable manner, within the framework of program activities. This recognition led to a decision by program managers that special emphasis in their program evaluation efforts should be given to process and outcome indicators.

In the evaluation of case management, for example, priority program outcomes must relate to the performance of health workers in facilities and to the behaviors of some health providers (e.g., mothers of febrile children). Managers also identified the availability of antimalarial drugs and supplies in health facilities as a priority area for outcome indicators.

Priority process indicators were also identified. They include the number of health workers trained in malaria case management and the provision of antimalarial drugs to health facilities at various levels in the health system.

Tracking such indicators provides useful information for program management, as shown by these data from Côte d'Ivoire (Figure 2). Information on the availability of resources and the performance of health workers in health facilities illustrates how measurement of a limited number of indicators can alert program managers to the strengths and weaknesses of their programs and provide an opportunity for appropriate corrective action. These data were collected during a special study of health facilities, but could also be obtained at less expense during routine supervision. Efforts to develop supervisory systems that include the regular collection and use of data on program evaluation are described earlier in this volume.

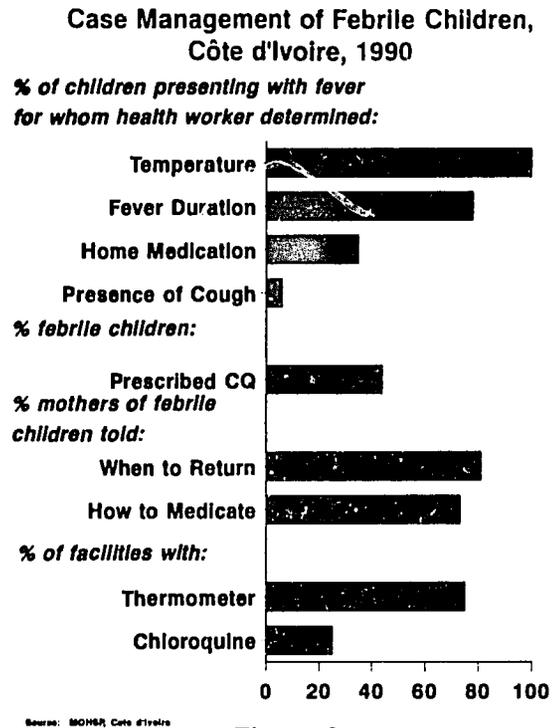


Figure 2

Improving program evaluation skills among program managers. A final result of Malaria Initiative activities in program evaluation, and perhaps the most important, is the improvement of the managers' skills. Measuring how these skills are applied in actual situations of malaria control program management would provide the most meaningful results of this process. However, since less than one year has elapsed since focused planning for program evaluation, it is still too soon to expect measurable changes in national-level evaluation activities. The Malaria Initiative focus on effective use of data to improve program policies, plans, and implementation should improve all aspects of program evaluation in the future, including operational research and internal review exercises.

Nonetheless, a comparison of malaria control program plans prepared by program managers before and after the Abidjan workshop is encouraging. At the beginning of the workshop, only 8 of the 17 participating countries had defined outcome indicators for use in the evaluation of their programs, while at the end of the workshop all countries had defined such indicators. This quantitative increase was accompanied by qualitative improvements, reflected in manager's contributions to international program evaluation efforts. Indicators defined in Abidjan and refined during the ensuing months were used as the basis for discussions about the evaluation component of the global strategy for malaria control during recent World Health Organization meetings in both Geneva and Brazzaville.

Conclusions

During a brief period, progress has been made in program evaluation among countries participating in the Malaria Initiative. Program managers have agreed that evaluation should play a central role in program management and have adopted a common evaluation approach. They have begun to develop guidelines and to select and standardize priority indicators.

However, several challenges remain. Program managers will have to adapt and test their preliminary guidelines and indicators in the context of national programs, together with their partners from the World Health Organization and the U.S. Centers for Disease Control and Prevention (CDC). The technical and financial assistance required for evaluation activities will have to be secured. Indicators for malaria control programs, and particularly those focused on malaria-related mortality and morbidity, remain imperfect and will need to be field tested and improved. In the long term, the set of indicators adopted to evaluate the epidemiologic impact of programs must permit reliable measurement at reasonable cost.

Strategies for the management of evaluation activities will need to be developed in individual countries. Managers will have to develop and test strategies to identify and train personnel responsible for evaluation; they will have to ensure that evaluation data are, and remain, of good quality; and they will have to translate these data into clear and useful summaries that can be used to plan and re-plan programs.

As for other elements of malaria control programming, frequent sharing of field experiences among African countries will be useful in finding solutions to common problems. Evaluation conducted at frequent intervals, from within programs rather than by external experts, will support better and faster responses to the challenges of malaria control.

References

1. Cronbach LS, Ambron S, Dornbusch R, Hess R, Hornik R, Phillips DW, Weiner S. Toward reform of program evaluation. San Francisco: Jossey Bass, 1980.
2. Heymann DL, Biritwum RB, Paget WJ. Evaluation of AIDS programs. In: Lamptey P, Piot P., eds. The handbook for AIDS prevention in Africa. Durham, North Carolina: Family Health International, 1990:203-10.
3. Molineaux L. Essential elements of the epidemiological approach to malaria control: Indicators, surveys and analysis. World Health Organization Document MAL/EC19/89.10. Geneva: World Health Organization, 1989.
4. Miller DC. Social indicators. In: Miller DC, ed. Handbook of research design and social measurement, 5th Ed. Newbury Park, CA: Sage, 1991:386-403.
5. Cambell DT, Stanley JC. Experimental and quasi-experimental designs for research. Chicago: Rand McNally, 1963.
6. Fisher AA, et al. Handbook for family planning operations research design. 2nd ed. New York: The Population Council, 1991.
7. Greenwood BM, Bradley AK, Greenwood AM, Byass P, Jammeh K, Marsh K, et al. Mortality and morbidity from malaria among children in a rural area of The Gambia, West Africa. Trans R Soc trop Med Hyg 1987;;81:478-86.

SECTION THREE

Summary and Future Perspectives

Where Do We Go From Here?

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Where Do We Go from Here?

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Introduction

All evidence from countries participating in the Malaria Initiative indicates that malaria causes the greatest morbidity and mortality in Africa. The World Bank has quantitated the toll taken by diseases, and places malaria first, tied with respiratory infections, in severe adverse economic and developmental effects throughout the continent¹. Despite efforts to control mortality by the use of drugs in the 1980s, the malaria problem is serious² and is worsening. This alarming situation is due to increasing numbers of susceptible persons in contact with the infected vector, spread of chloroquine-resistant *Plasmodium falciparum* across the continent, and lack of adequate health infrastructures to provide populations with optimal patient management and prevention services. However, other issues, dealing mainly with public health management challenges, can be dealt with successfully today.

Solvable Challenges

Until now, national and international commitment to malaria control has been dismally inadequate, particularly in Africa. The reticence was based, in part, on the view that reliance on anti-malarial drugs in the context of primary health care alone would not achieve mortality reduction. The increasing malaria problem, including occurrence of highly publicized epidemics in Madagascar, Ethiopia and elsewhere, and importations from endemic areas into developed countries, have stimulated concern and action where there was apathy. There is the realization that, without attention to malaria, improved child survival will not occur in Africa.

As is so often the case, the limiting factor in translating political will into action is the allocation of staff and other resources to malaria control. Along with the malarious African countries, collaborating countries and organizations in the developed world have noted the meagre resources accorded malaria control over the past two decades, and are presently devising plans to increase substantially their contribution to malaria control.

Additionally, there must be coherent national policies and strategies developed on the basis of locally acquired epidemiologic and behavioral information. While there are several malaria control strategy options, only drug use, personal protection, and human behavioral change are reasonable options at present. Traditional large scale vector control operations are not feasible; control by genetic alteration of *Anopheles* mosquitoes and vaccination are still on the distant horizon. The focus should be on those interventions that are most cost-effective in achieving the national objectives. Until recently, provisions for developing policies, strategies, plans, and evaluation mechanisms have been fragmentary and inadequate in most African countries, impeding investments in malaria control nationally and internationally.

The public and private components of peripheral health services and communities in detecting, managing, and preventing malaria and other illnesses, their roles too long neglected and ill defined, must be brought more successfully into the malaria control equation. As so much of the morbidity and mortality in Africa never comes to the attention of the formal health services, attention to health events and potential health providers at the periphery is essential if malaria control is to be achieved.

Finally, it must be proven that the vigorous implementation of malaria control strategies will achieve reduction of morbidity, mortality and disability from malaria.

What Must be Done?

Commitment - WHO (World Health Organization) has drawn attention to malaria control in the 1990s with several high-level meetings focusing on possible solutions to the malaria problem. A meeting of ministers of health was held in Amsterdam in October, 1992, at which time a Global Malaria Control Strategy was ratified³. Preceding this "Ministerial Summit", all African country malaria program managers and other public health officials met under the aegis of the World Health Organization Regional Office for Africa, in Brazzaville, Congo, to develop a strategy focusing on regional issues. An "African strategy" was developed and promulgated during the meeting. This strategy elaborated specific actions to be undertaken by endemic countries, the World Health Organization, and collaborating international agencies⁴. Following the Ministerial meeting, the World Health Organization Regional Office for Africa assembled a group of specialists to develop mechanisms to help implement the global and regional strategies, and indicators to assess progress⁵.

The strongest signals must come from the leadership within endemic countries. Governments must identify malaria control as a priority, and give increased support to the malaria program manager, the malaria unit, and the infrastructure in the public and private sectors that can contribute to malaria control. Existing financial and logistic resources must be carefully inventoried, properly allocated, and additional resources mobilized. National malaria control programs must be strengthened, and better coordination and integration of malaria control activities into village development schemes must be achieved.

At the same time, agencies and institutes with a regional and an international perspective, such as the United Nations Development Program (UNDP), overseas development agencies in "northern" countries, universities, foundations, and in particular, private voluntary agencies must join countries and World Health Organization in the fight against malaria. With their participation the battle can be won. Without their help the outlook for malaria control is grim.

The Administrative and Programmatic Process - It remains to be demonstrated that the process outlined in the preceding papers (development of policies, plans, implementation actions, and

evaluation mechanisms) will lead to achievement of national malaria control objectives. Yet, without these essential steps malaria will not be controlled. As a result of recent workshops and follow-on activities, numerous African countries have systematically analyzed their national malaria status, identified problems hindering control, and taken or proposed steps to improve control with the tools that are available. While this is encouraging, we must acknowledge that some problems are substantial.

Procuring and distributing drugs⁶, training and educating health workers and community members⁷, and making decisions on key technical issues are major challenges. Major technical issues requiring decisions that are pivotal for implementation of malaria control programs include: chloroquine versus pyrimethamine-sulfadoxine as a first-line drug for therapy⁸, undertaking a vigorous malaria prevention program for pregnant women using an effective drug regimen⁹; and the use of insecticide-impregnated mosquito nets to protect individuals and communities from contact with *Anopheles* mosquitoes¹⁰. These decisions are difficult, but they can be made locally based on a well-reasoned assessment of available local information, resources, commitment to control, and guidance from synthesis of previous experiences^{11,12}.

How are We Doing? The Analytic Process - Policy and program development must be based upon reliable data. The information collected through the monitoring and evaluation process needs to be analyzed and disseminated systematically, and in a form usable by program managers and other planners at the central, district, and peripheral levels¹³. Resource allocation is greatly dependent on accurate and timely information, especially in the current atmosphere of shrinking budgets, deficit spending, and structural adjustment. These realities impact on the developing and developed countries.

As the program develops, the policy, planning, and implementation process should be revised periodically, based on information indicating whether or not success is occurring. To follow decreasing disease trends, the ultimate indicator of program success, a modern surveillance system needs to be established. This system would include electronic information interchange mechanisms, and would be based initially on data accrued at sentinel hospitals and selected health centers¹⁴.

Patient Management: Can We Improve? - Patient management will remain the highest priority for controlling the effects of malaria in Africa, irrespective of what other interventions come into use. Formulation, dissemination, and use of clear and detailed guidelines for managing febrile/malarious patients are essential and have been developed by the World Health Organization for uncomplicated and severe illness^{15,16}. Guidelines for managing febrile patients should be developed within each country, and used for training all categories of health care providers in the public and private domains. The guidelines will have an impact not only on the quality of care delivered to patients, but on all program support systems: commodities, health worker training and supervision, patient and community education, and the monitoring and evaluation systems.

Currently, the drug issues, e.g. supply and distribution, availability, cost, use, and, in some areas, quality, remain the weakest operational components of malaria programs. Without adequate supplies of chloroquine, sulfadoxine-pyrimethamine, and quinine throughout all endemic areas, and their proper use and management⁶, other efforts to control malaria will not be fruitful.

In all programs based primarily on patient management, it is important that each patient-provider contact be used to motivate parents to participate actively in the disease control process. Most importantly, the first dose of the drug(s) must be given at the health facility. Next, providers, supported by clear policies and concerned supervisors, must ensure that parents leave the hospital, clinic, or health provider residence (the “health hut”) knowing what is needed to complete the prescribed treatment at home, to recognize when to return to the same provider, and when to go to a referral facility. Client contact in a treatment setting can also be used to inform family members of cost-effective measures available locally to prevent illness.

Prevention: Is There a Role? - Relatively little has been accomplished with malaria prevention strategies in Africa. Yet, options for preventing placental infection and low birth weight by treatment or chemoprophylaxis are effective, even in areas with intense *P. falciparum* resistance to chloroquine⁹. One of the most promising new technologies for personal protection is the use by individuals and communities of insecticide-impregnated mosquito nets¹⁰. Do they work? Probably yes, but not as perfectly as desired, particularly in areas with very intense and stable transmission¹². Countries need to begin the decision making process to initiate and evaluate the widespread use of mosquito nets.

Residual house spraying and other classical vector control operations will be used only by those countries with the resources to maintain these complicated and costly operations. These would include countries with a strong epidemic potential, in the far north and southern areas of the continent, or with a firm commitment and ability to maintain control in urban and peri-urban areas.

Epidemics are disruptive events, and their prevention and management are major components of the Global Strategy. This will require concerted efforts in planning and establishing human and vector surveillance. Criteria will be needed for defining and identifying areas with epidemic potential, tracking population movements, preparing contingency directives, and stocking supplies of drugs and vector control materials if an epidemic occurs.

Keeping Children Healthy: Integrated Care and Prevention - Malaria control program managers and providers will need to understand other disease control activities and be willing and able to integrate effective interventions for these diseases into their own work. The problems of pneumonia¹⁷, anemia¹⁸, low birth weight¹⁹, and HIV/AIDS²⁰ have links to malaria that affect healthy children and pregnant women. Strategies to control these diseases together will need to be developed and promoted strongly.

Beyond malaria, more concerted actions can be taken to prevent low birth weight and to manage the “sick child”. Nutritional guidance and supplements, prevention of syphilis and HIV, and tetanus toxoid immunization can protect the newborn and mother during gestation; these interventions should be integrated more effectively into antenatal care programs. The World Health Organization is currently testing algorithms that will allow a more precise clinical diagnosis and improved treatment of ill children. Epidemiologic studies are needed in each country to identify the risk factors for maternal and childhood morbidity and mortality, and used to plan effective patient management and prevention measures.

Promotion of family and community involvement, in actions that promote personal good health and assure the permanence of the health services desired by the community, including the omnipresence of vital drug supplies, is essential. Sustainability of malaria patient management and prevention services will depend in great part on the success of the “Bamako Initiative” and other community managed self-help schemes.

Transferring Success from One Area to Another - Each country that has declared malaria a major health problem should designate a priority area for initial special efforts. The national policy, strategy, and plan, as defined and written locally, should be applied intensively in this area, and the results evaluated carefully. The successes must be proven with convincing measurements of process, outcome, and impact indicators. Once success is achieved, the control strategy will be applied to other areas of the country in a staged manner. This will allow a rational approach to resource allocation, and stimulate more sophisticated planning and increased partnerships with donors. Successes in one area of the country will engender more successes and increased commitments, nationally and internationally, from partners who will share the satisfaction and reap the benefits of malaria control²¹.

Conclusions

For the past twenty years, essentially all of the emphasis on malaria control in Africa has focused on therapy; to many, what has emerged has been the ominous observation that the drug used, chloroquine, was becoming less effective. In the immediate future, diagnosis, patient education, patient referral, as well as judicious use of efficacious alternative drugs (particularly sulfadoxine-pyrimethamine) will receive more attention and use. Prevention interventions will emerge as cost-effective and operationally feasible; these will include chemoprophylaxis or pulsed treatment of primi- and secundigravida women, and the use of insecticide impregnated mosquito nets. The support strategies to promote and implement these interventions must, likewise, increase in importance; these are development of policies and plans; focus on commodity provision, training (especially pre-service training), patient education, community education, and supervision; and assurance of monitoring, evaluation and applied research.

The experiences related in this monograph provide a solid base for undertaking the next set of actions needed to achieve malaria control in Africa. The employment of a step-by-step, systematic approach, guided by timely, usable data, needs to be coupled with partnerships of

program managers, their ministries, private sector providers, and international collaborators and donors. Capacity building for malaria control, especially at the national level, merits the greatest emphasis in African countries, especially those that have had few malaria activities.

The Malaria Initiative is one response to the pessimists who allege that mosquitoes, parasites, and poverty have won the battle in Africa. Those who claim that political and socio-economic conditions are so extraordinarily difficult that little can be achieved on the continent about malaria are wrong. The evidence is, that by building on previous experiences both good and bad, 21 francophone African countries have joined with the Centers for Disease Control and Prevention and the World Health Organization to go beyond previous approaches to malaria control. What remains to be seen is whether effective action will follow planning. This is the challenge that we must face with confidence.

References

1. World Bank. World Development Report, 1993: Investing in health priorities. New York:Oxford University Press,1993:27.
2. World Health Organization. World malaria situation in 1990: part I and part II. Wkly Epidemiol Rec 1992;67:161-7 and 67:169-74.
3. World Health Organization. Global malaria control. Bull World Health Organ 1993;71:281-4
4. World Health Organization. Strategies for malaria control in the African region and steps for their implementation. Brazzaville:World Health Organization,1992.
5. World Health Organization. Report of the Regional Working Group on malaria control in the African Region, Brazzaville:World Health Organization,1993.
6. Foster SDF. The distribution and use of antimalarial drugs - not a pretty picture, In: GAT Targett, ed. Malaria: Waiting for the Vaccine, Chichester: John Wiley and Sons,1991:123-38.
7. Bryce J, Cutts F, Naimoli JF, Beesley M. What have teachers learnt? Lancet 1993;342:160-1.
8. Bloland, PB, Lackritz EM, Kazembe PN, Were JBO, Steketee R, Campbell CC. Beyond chloroquine: implications of drug resistance for evaluating malaria therapy efficacy and treatment policy in Africa. J Inf Dis 1993;167:932-7.
9. Steketee RW et al. Malaria prevention in pregnancy: The effects of treatment and chemoprophylaxis on placental malaria infection, low birth weight, and fetal, infant, and child survival. ACSI-CCCD Catalogue Number 099-4048, Atlanta: CDC,1993.

10. Rozendaal JA. Impregnated mosquito nets and curtains for self-protection and vector control. *Tropical Diseases Bulletin* 1989;86:R1-41.
11. Steketee RW et al. Controlling malaria in Africa: Progress and priorities. ACSI-CCCD Catalogue Number 099-4050, Atlanta: CDC, 1993.
12. Steketee RW et al. Addressing the challenges of malaria control in Africa, ACSI-CCCD Catalogue Number 099-4072, Atlanta: CDC, 1993.
13. Bryce J, ROUNGOU J-B, NGUYEN-DINH P, NAIMOLI JF, BREMAN JG. Working paper: Evaluation of national malaria control programs in Africa. ACSI-CCD Catalogue Number 099-4032, Atlanta: CDC, 1993.
14. Toole M, Karsa T, Fitzgibbon B, Bussell K. Development of health surveillance in Togo, West Africa. *MMWR Morb Mortal Wkly Rep* 1992;41(SS4):19-26.
15. World Health Organization. Guidelines for the diagnosis and treatment of malaria in Africa: Report of an informal consultation of experts on malaria in the African Region. AFRO Technical Papers No. 22, Brazzaville: World Health Organization, 1990.
16. World Health Organization. Severe and complicated malaria, 2nd edition. *Trans R Soc Trop Med Hyg* 1990;84 Suppl 2:1-65.
17. Redd SC, Bloland PB, Kazembe P, Patrick E, Tembenu R, Campbell CC. Usefulness of clinical case-definitions in guiding therapy for African children with malaria or pneumonia. *Lancet* 1992;340:1140-3.
18. Hedberg K, Shaffer N, Davachi F, Hightower A, Lyamba B, Paluku KM, et al. Plasmodium falciparum-associated anemia in children at a large urban hospital in Zaire. *Am J Trop Med Hyg* 1993;48:365-71.
19. Kramer MS. Determinants of low birth weight: methodological assessment and meta-analysis. *Bull World Health Organ* 1987;67:663-737.
20. Greenberg AE, Nguyen-Dinh P, Mann JM, Kabote N, Colebunders RL, Francis H, et al. The association between malaria, blood transfusions, and HIV seropositivity in a pediatric population in Kinshasa, Zaire. *JAMA* 1988; 259:545-9.
21. Greenwood BM, Baker JR, eds. A malaria control trial using insecticide-treated bed nets and targeted chemoprophylaxis in a rural area of The Gambia, West Africa. *Trans R Soc Trop Med Hyg* 1993;87 Suppl 2:S2/1-60.