

FUTURE ROLE OF THE AGENCY FOR INTERNATIONAL DEVELOPMENT IN WORLD-WIDE MALARIA CONTROL PROGRAMS

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ABSTRACT. The world-wide importance of malaria in restricting economic growth, labor productivity and social progress in many less developed portions of the world and A.I.D.'s past, present and future role in the control of this disease is briefly reviewed. In developing its future role in a changing and dynamic setting, the A.I.D. has developed and established new policies for malaria control which interlink more closely with the Primary Health Care systems and directly relate, in many cases, to other A.I.D. health projects in child survival. These new policies and criteria are summarized. A review of the three emphasis areas of research, training and program design is provided. Intersectorial coordination is stressed as is cooperation in its assistance efforts with multilateral and other bilateral agencies in combating this disease. The paper concludes that malaria remains an important health interest of the A.I.D. and support for technology development, transfer and adaptation is expected due to the economic and social importance of the disease.

INTRODUCTION

The negative impact of malaria upon economic growth has been widely recognized. Highly debilitating, the disease in many tropical and subtropical countries restricts labor productivity, further reduces the already inadequate production of food, and inhibits educational attainment. Approximately 40% of the world's population—nearly two billion people—live in area of malaria risk.

Malaria is widely recognized as one of the world's most killing diseases. It is less widely recognized that the burden of malaria mortality is borne to an overwhelming degree by infants, children under five and pregnant women.

Progress has been made in the diminution of malarial infection in many countries, and the disease has been eradicated in approximately 40 countries where it had been historically prevalent. However, endemic malaria continues to be a major public health problem because of the resurgence of the disease in many regions where it had been controlled. Sustained economic growth is difficult or impossible in countries with serious uncontrolled malaria problems, and the failure to control malaria may over the long term be far more costly than the outlays for a well-organized malaria control program.

The Agency for International Development (A.I.D.) investment in malaria programs, particularly in the 1960s, (in support of the World Health Assembly's 1955 call for world-wide eradication of the disease) has exceeded over a billion dollars. During the past decade, however, A.I.D.'s health efforts have stressed encouragement and assistance to the governments of the

less developed countries (LDCs) in developing and implementing primary health care (PHC) programs and, more recently, programs concerned with Child Survival. Although A.I.D.'s assistance to anti-malaria programs has been reduced in recent years, malaria resurgence around the world has led to renewed attention. At present, A.I.D. is involved in malaria and other vector-borne disease control activities in Africa, Asia/Near East, and Latin America. A.I.D. involvement ranges from support of training and operational research to the provision of commodities and technical services. Support of the local currency costs of malaria control is no longer normally a part of A.I.D.-supported malaria control projects, but contributions are made from PL 480-generated local currency or, in rare cases, from project funds, to meet a portion of local costs for on-going host country efforts in the development of new technologies. In addition, A.I.D. has provided approximately \$60.0 million in central funding over the last 20 years in support of malaria research connected with the development of a malaria vaccine(s).

A.I.D. MALARIA POLICY AND ASSISTANCE CRITERIA

Malaria policy. Malaria's negative impact on economic and social development, its effect in shortening life expectancy, its toll in morbidity and the concentration of mortality among infants, young children and pregnant women, give the disease a high priority in many tropical countries of Asia, Africa and Latin America. A.I.D. malaria assistance in response to requests from interested countries gives emphasis to the design process to prepare projects with clear, prioritized objectives; the development and

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transfer of cost-effective technology; and a choice of control tactics within the framework of indigenous self-sufficiency.

1. *Country commitment.* A.I.D.'s policy in responding to requests for assistance in dealing with the problems of malaria requires that the requesting country recognize and commit itself to long-term control of its malaria problem. Without such a country commitment, no amount of external support and no plan of operation, however well conceived, can assure long-term success in controlling malaria.
2. *Tactical flexibility.* A.I.D. does not attempt to prescribe the requesting country's tactical approach to malaria control and the degree of control to be attained and maintained. A plan for malaria control is, however, appraised on the basis of its technical feasibility and the country's administrative capacity and long-term financial responsibility. This appraisal provides a reasonable anticipation that the assistance requested will lead to a supportable and self-sustained malaria control activity—whatever its scope—which can be expected to continue beyond the termination of external assistance.
3. *Use of PHC system.* Economy of execution demands that all malaria programs make the maximum use of existing (and potential) PHC systems, consistent with the capacity of such systems to carry out their assigned role. However, the presence or absence of a PHC system does not determine whether or not support should be given to an anti-malaria program.

In some countries, the PHC system, supported by a mandatory core of malaria expertise within the Ministry of Health, might be the only vehicle for malaria control.

4. *Research.* The research component of A.I.D.'s malaria effort includes but is not limited to continuation (through to the conclusion of field testing) of A.I.D.'s long-standing support for basic and applied research leading to a malaria vaccine (or vaccines). Other forms of research include applied and operational vector-borne disease control research to determine the effectiveness of innovative as well as conventional control measures and combinations of measures; research for development of a simplified yet accurate diagnostic tools essential to enable quick and accurate diagnosis of malaria by individuals at the periphery of the PHC system who possess very low levels of technical training.

Criteria for A.I.D. assistance to anti-malaria

programs. A.I.D. support of a country request for assistance to a malaria control effort is considered only when the country makes a *long-term national commitment* to a goal-oriented, well-planned, organizationally sound, technically and administratively feasible and costed plan of malaria control. This plan includes a full account of the country's physical and human resources down to the community level, takes into account any recognized constraints to program success, and includes proposals for overcoming or accommodating to such constraints.

The prerequisites for assistance include:

1. *Request.* A request from the host government for assistance in planning, implementing or evaluating malaria control efforts, whatever the level of control sought, must be supported by evidence of national will to carry out the proposed program and of the national priority assigned to the problem of malaria.
2. *Plan.* The request should be directly related to a plan describing the malaria problem, the proposed course of action and the anticipated results. The plan should provide:
 - a. The area in which the program will be carried out, population affected, and specific population groups and age groups targeted for attention.
 - b. Base line epidemiological and entomological data which describes the existing problem in quantitative terms, to enable subsequent evaluation of accomplishment under the program.
 - c. A description of plans for supervising, monitoring, evaluating and providing essential specialized technical management support to workers at the periphery.
 - d. A life-of-project projection of requirements in terms of manpower, money (local currency and foreign exchange) and materials, defining in terms of quantity and quality the resources to be provided by the host government and those expected from external sources (A.I.D., World Health Organization (WHO) or other agencies).
 - e. Logistic and transportation requirements of the project. This element of the plan should include a description of equipment needed as well as methods of procurement, warehousing, distribution, stock control, and reorder levels, etc., and as appropriate, provision for equipment and vehicle maintenance.
 - f. Training requirements and a plan defining who requires training, where, when, and by whom.

- g. The relationship of the malaria control program to other program activities and priorities of the Ministry of Public Health.
 - h. Methods of assuring coordination and support from other elements in the Ministry of Health; with other health agencies in the country; and with other ministries or agencies (including those in the private sector) concerned with activities affecting malaria in the country.
 - i. The social and economic impact of the proposed program.
 - j. How the project will be continued beyond the period of external assistance.
3. *Review.* Requests for assistance are approved only on the basis of an A.I.D. review of a malaria control proposal based on the recommendations of a recent joint WHO/National Government evaluation team. Such a review is specifically designed not only to identify the program's technical, administrative and economic feasibility, but also its affordability beyond the point of external support. The review would also examine the extent to which long-term goals of the plan take into account the known constraints to the attainment of such goals.
4. *Assistance in plan preparation.* The preparation of a malaria control plan is often beyond the immediate capacity of a number of countries. Assistance in plan preparation, including feasibility studies as embodied in small-scale projects to test the applicability of intervention techniques, warrants support by A.I.D. as well as other sources of external assistance. A.I.D. is prepared to provide funding support to experimental programs when they are part of a plan to improve program efficiency or cost-effectiveness, and where adequate provision for careful evaluation has been made.

MALARIA PROGRAM ASSISTANCE EMPHASIS OF A.I.D.

In pursuit of A.I.D.'s enunciated goal of helping developing countries become self-sufficient in providing broad access to cost-effective preventive and curative health services, A.I.D. malaria program assistance activities concentrate on the development and transfer of cost-effective malaria control technologies at various levels of control, ranging from reduced malaria-related mortality to comprehensive vector control. A.I.D. has accordingly intensified its efforts in three key areas: research, training and program design.

Research. The greatest successes in malaria control programs have been achieved through anopheline mosquito control to prevent spread of malaria. Research on these vectors of malaria is being carried out in order to improve control methodology. Such research includes studies of the vectors themselves, improved insecticides and insecticidal application equipment, and comprehensive approaches to vector control, i.e., the utilization of all available methods in an integrated program designed to meet the specific requirements for control of each vector.

1. *Centrally funded research.* A.I.D. supports malaria vaccine research at a level which will lead to the completion of this important project. When a malaria vaccine becomes available for field use, it will represent a very important tool for prevention and/or control of malaria, but not the only tool. The vaccine will be an additional tool to carry out cost-effective malaria control. Because of current operational difficulties, especially drug resistance in malaria parasites and increasing insecticide resistance in mosquito vectors, new research activities are being encouraged such as:
 - a. Simplified malaria diagnostic and survey methods.
 - b. Identification, clinical evaluation and field testing of new anti-malarial drugs through to registration and approval for human use.
 - c. Identification and testing of new insecticide compounds and biological agents as alternatives for insecticides to which resistance has developed or which may in some situations be unsuitable because of vector behavior.
 - d. Development and testing of improved insecticide formulations.
 - e. Development of test methodology for use in specifications necessary to ensure delivery to the field of high quality insecticides, application equipment and packaging.
 - f. Improved methods and techniques of insecticide application.
 - g. Further investigation of comprehensive vector control, including the use of all available techniques—such as larviciding, adulticiding by space spraying as well as residual spraying, biological control, source reduction and water management.
 - h. Development of a variety of alternative, possibly novel, malaria control measures.
 - i. Further investigation of epidemiological determinants of the malaria problem which affect human ecology and there-

fore the severity of the malaria problem or the feasibility of its control.

2. *Operational investigation.* A.I.D. supports operational research at the program level which are essential to ensure effective malaria control programs such as in Ecuador and Belize. Provisions are made in country programs for an operational research component in order to develop the area-tailored vector and parasite control programs upon which effective anti-malaria measures can be based. Such a technical research component may be used to determine the optimum curative drug, the proper dosage and the high-risk populations as well as monitor drug sensitivity. Adequate protocols and carefully supervised field trials are conducted prior to large-scale operational use of new materials, equipment or techniques in order to determine their cost effectiveness for the specific ecological and epidemiological situations.
3. *Review of proposed research.* A.I.D. has established and maintains an effective system of review for malaria research proposals, especially at the central and regional levels, to assure against duplication of efforts. It also coordinates its planned research activities with the World Health Organization, with the National Academy of Sciences, with other concerned U.S. research groups, and with other bilateral research organizations. Maintenance of close contact with *agricultural* operational and research interests in insecticides is done to avoid later problems. The intrinsic nature of present malaria control programs is such that research in support of effective, operational programs is an absolute necessity for long-term success. The investment in control-related research is expected to increase.

Training. A.I.D. sponsorship of training related to anti-malaria programs is considered essential. The need for training is apparent at all levels of malaria program personnel in most countries. Strengthening of national training capability is a matter of priority for A.I.D. support.

In addition, A.I.D. supports jointly with WHO (as it has done in Asia and Latin America) the development of collaborating institutions at the regional or inter-regional level to provide a better utilization of training resources.

Key national personnel, especially in scientific, operational, public health and administrative positions, are provided opportunities to increase the skills required to carry out the functions of their positions. Such training is pro-

vided in their own countries, in the U.S., or in a third country, as is deemed appropriate. Degree-level training is not usually funded as A.I.D. training support is primarily aimed at in-country, hands-on training. A.I.D. supports the development and production of training materials at all levels.

Program design. A.I.D. malaria assistance places emphasis on the design process to assure that an approved program is keyed to a detailed analysis of the burden which malaria places on the country; to practical technologies that work; to the available technical and administrative capacity; and to the possibility of national self-sustained support beyond the period of external assistance.

Malaria programs are designed and evaluated using adequate epidemiologic data on malaria, its transmission and its health consequences in the area. While malaria control in some countries is limited to chemotherapy to reduce mortality, many control programs are based entirely or in great part on vector control—chemical, environmental or biological, or a combination of these methods. Entomological surveys to determine the vector species, breeding sites and breeding habits are essential to successful vector control. Determination of the most cost-effective insecticide can only be made by field-test comparison of candidate insecticides under local conditions.

Local drug and insecticide manufacture are in some instances technically feasible and consistent with A.I.D. policy to encourage and support local formulation of anti-malarial chemicals. However, A.I.D. requires careful quality control and uniform packaging of these products to ensure both efficacy and safety to humans.

CONCLUSIONS

Sustained improvement in control of malaria-related mortality and morbidity is essential for economic development and increased productivity in many developing countries in the tropics and sub-tropics. The U.S. has an important role to play in improving health and the quality of life in developing countries. With the world-wide resurgence of malaria, this disease assumes a high priority for international assistance. The A.I.D. is providing assistance to developing countries to enable them to become more self-sufficient in providing cost-effective protection against malaria.

In countries where vigorous and well-managed PHC programs exist and particularly in countries where technical and financial considerations limit malaria control options to mortality or morbidity activities to selected groups, A.I.D.

anticipates that its assistance to anti-malaria efforts may be channeled through the PHC and Child Survival programs. In countries where malaria is endemic, malaria control must become an essential component of PHC and programs aimed at the health improvements for infants and children.

A.I.D. malaria program assistance concentrates on improving control efforts through better program design and management; supporting

malaria programs which offer the possibility of long-term, self-sustained viability; improving national and international training; and increasing biomedical research, operational research and field testing. A.I.D.'s support for technology development, adaptation and transfer is expected to continue. No other area in the field of public health offers a greater opportunity for a lasting contribution to economic progress and individual fulfillment in the developing world.