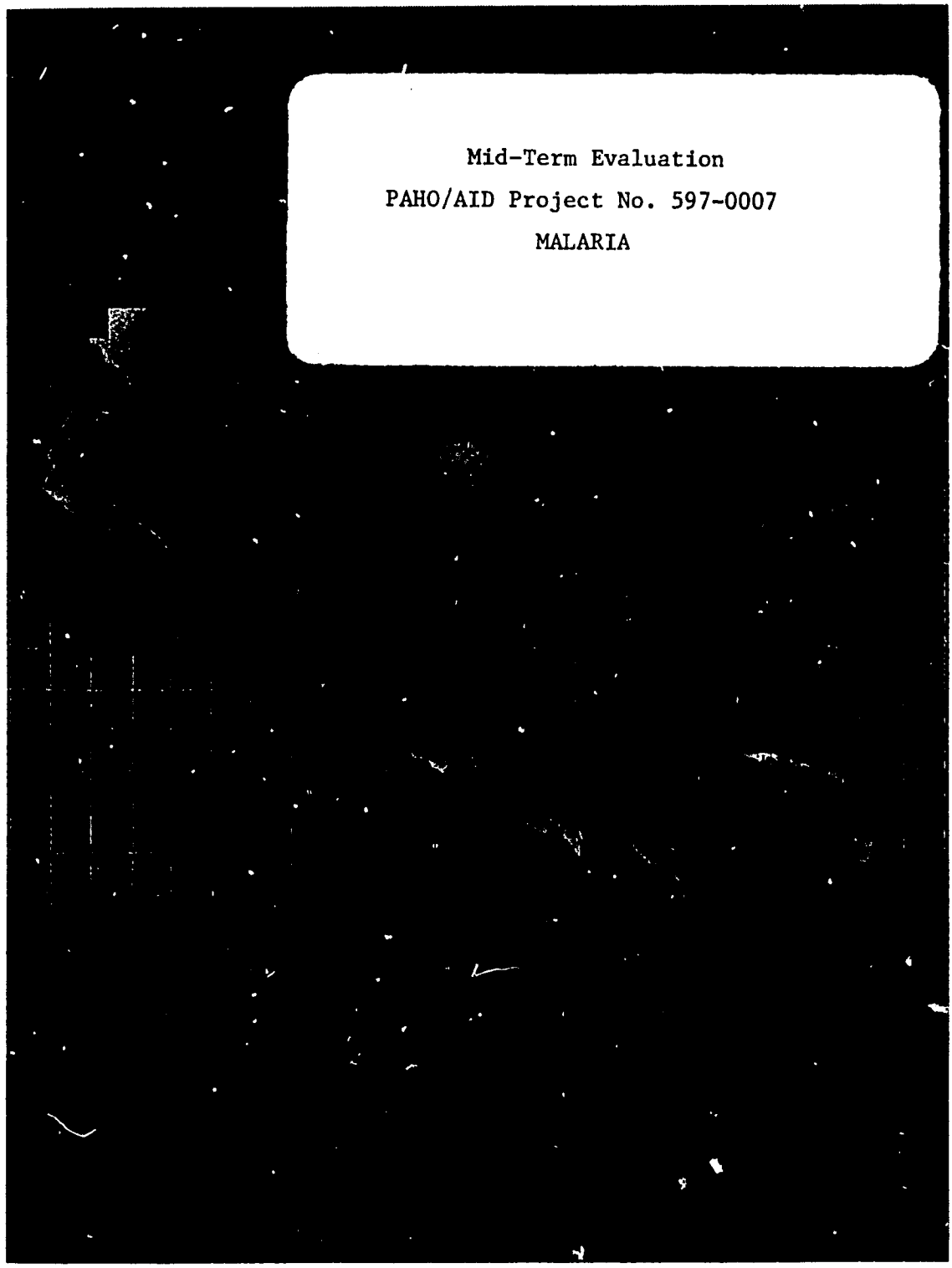
PRIORITY HEALTH NEEDS IN CENTRAL AMERICA AND PANAMA



Health as a bridge for peace, solidarity and understanding among the peoples of Central America and Panama.

TABLE OF CONTENTS

II. Evaluation Summary

1. Malaria

Problem and Strategy

The Project was designed to strengthen malaria programs and establish and institutionalize a training and research program for vector borne diseases in the sub-regional context of organizational change, economic crisis, and resurgence of malaria and other vector borne diseases. The sub-region has a disproportionate share of the malaria cases of the entire Latin American and Caribbean region. As malaria does not recognize frontiers, the Project intended to develop a truly sub-regional approach to prevention and control, facilitating cross border prevention and control activities and sub-regional information exchange and coordination. The Project operates in the context of important program changes such as the development "new" cost effective measures of long-term malaria control, and the integration of the heretofore specialized malaria organizations with other vector control divisions and with the general health services.

Findings

(1) Malaria programs have been strengthened through the establishment of effective training and education programs at various levels, though there is much that remains to be accomplished. In addition to the current stress on technical topics, training in health planning, administration and management continue to be a high priority needs.

(2) Malaria programs have also been strengthened through the integration of malaria prevention and control with general health services, though there is a great deal of work ahead before malaria control is more fully integrated with general health services.

(3) Sub-regional and national research activities have focused upon key topics, but the sub-regional research is behind schedule and local research capacity is limited. The Project is addressing the need to enhance research capacity through post-graduate and other types of education and training, but this is a slow process and will bear fruit in the future.

I. Evaluation Abstract

Under the terms of the Malaria and Essential Drugs Project (Nos. 596-0136, 597-0136, 597-0007), the United States Agency for International Development (hereafter USAID) made available to the Pan American Health Organization (hereafter PAHO), Regional Office of the World Health Organization, the grantee and project implementing agency, grants of US $7,860,000 for a four year period, starting March 30, 1985 and ending March 31, 1989 to strengthen malaria control programs by establishing and institutionalizing training and operational research activities regarding vector borne diseases, and to improve essential drug procurement, distribution, quality control and utilization programs by establishing and institutionalizing training activities in the Central American countries of Guatemala, El Salvador, Honduras, Costa Rica, and in Panama and Belize.

The malaria and essential drugs activities constitute two separate but related components. The two loom large in the sub-region, where the goal of health for all means advances in both malaria control and in essential drug activities.

This planned mid-term evaluation was scheduled for September 1987, but because of delays in identifying and approving evaluation personnel, implementation actually coincided with the three-quarter mark. Accordingly, the evaluation covers the period from project inception to February 1988, and it addresses follow-on planning, as well as possible course corrections during the fourth year of implementation. As stipulated, the evaluation is descriptive and emphasizes process; it does not attempt to measure Project impacts upon morbidity or mortality or upon general health conditions.

The evaluation methodology basically consisted of (1) reviewing project documents at Washington and country levels, (2) interviewing key personnel in USAID, PAHO, national government implementing agencies, and in USAID contract organizations, (3) observing and interviewing at as many levels as possible within the operating and collaborating agencies. Given the limited time available for the field portion of the work--about three working days per country--the evaluation was necessarily opportunistic, with an emphasis upon the sub-regional context and process. The evaluation was conducted by three individuals, respectively, a specialist in malaria, essential drugs and social development.

March 9, 1988

(4) The sub-regional focus and operational interchanges have enhanced local problem solving capacity, improved institutional communication and coordination, and taken advantage of economies of scale, while adding an important element of program continuity and momentum.

(5) The Project seems to work in highly compatible and even synergistic fashion with several bilateral and multilateral projects supporting related activities. The Project has contributed to and participates in a positive climate of collaboration and cooperation among funding and operating agencies.

(6) There is no self-evident rationale at the operational level for combining malaria and essential drug components in a single project, though anti-malaria tablets are probably the most common essential drug in the sub-region and though the eventual integration of all major health activities is desirable.

Recommendations

(1) It is evident that professional education and training have generated much interest and enthusiasm among the health workers towards the integration of malaria and general health services, a process which is considered essential to the future of malaria control programs specifically and vector control program in general. It is recommended that a high priority be given to a continuation of training, including the operational level (or "health region"), corresponding to the district, area or health center in the different national systems.

(2) The basic unit of malaria vigilance activities is the network of active and engaged community level voluntary collaborators. During the last three years, some of the voluntary collaborators attended workshops, but most did not have this opportunity. Therefore it is recommended that the current training cycle for voluntary collaborators be completed, and that additional means be explored for constantly strengthening the communication link between community volunteers and general health service personnel or the malaria service, depending upon the status of integration.

(3) Similar to the successful epidemiology modules used for training professional staff, it is recommended that PAHO develop analogous manuals or guides for training technical staff and voluntary collaborators. This may involve "popularizing" some of the existing material for broader use or adoption of parts of existing national written materials. PASCAP/PAHO should collaborate in the development of these teaching materials.

(4) The experience of Honduras in the integration of the malaria program into general health services, (as seen in Catacamas) and the accomplishment of El Salvador in source reduction projects (as seen in coastal marsh and lagoon areas) are successful national examples of developments in these respective areas. They could lead to very useful country-hosted seminar on these and other themes for malaria and general health service workers. Organized by PAHO, the workshops would be substantive in character, with an emphasis on issues, obstacles and opportunities. The seminar would allow sufficient time for field observation, not less than three working days. For example, a source reduction workshop in El Salvador would involve a full day or two visit to the region to visit specific source projects, both underway and planned. This would be followed by a day of discussion and exchange of information, as well as follow-up documents (e.g., video tapes) to aid in national discussions of the lessons learned.

(5) It is appropriate that the new curriculum of the malaria and environmental sanitation course in Venezuela places much emphasis upon epidemiology of vector-borne diseases (not just malaria) and upon environmental sanitation. It is recommended that the course be fully utilized to train more professionals from general health services.

(6) As in all training, but especially international training, candidate selection, orientation and career path are crucial issues. To some extent these are national issues, and appropriately so. Nonetheless it is recommended that sub-regional procedures be reviewed to optimize training resource allocations by "internationalizing" them and by taking as active a management posture as possible. This may require a diagnostic assessment and or monitoring of experiences to date.

(7) The sub-regional research project on the ecology and biology of A. albimanus has selected a crucial topic, but has been slow to get underway for a variety of reasons. The research should be continued beyond the current Project deadline of March 1989.

(8) Biological control and source reduction activities, including the potentially wide-spread use of larvivorous fish, need to be studied throughout the sub-region as long-term control measures. It is recommended that intensive field trials be carried out with larvivorous fish as a sole control measure or in combination with source reduction under different ecological conditions. Moreover, there needs to be an intensive program of communication and exchange regarding cost-effective and integrated control measures, drawing upon experiences from other parts of the world (e.g., Peru, India), wherever technology is primarily reliant upon local resources.

(9) The social and economic dimensions of malaria and other insect-borne diseases need to be better understood in order to design and operate more integrated and self-reliant programs. This research needs to reach beyond the isolated "community" approach to take a more encompassing social/ecological view and beyond the "peon" approach to a more pro-active sense of participation. There may be small-scale income generating activities that also have malaria control benefits which should be explored, a la Indian experience at the Vector Control Research Center in Pondicherry. Support should be provided to further such research, with particular emphasis upon sub-region-wide issues, such as related to the current research on A. albimanus.

(10) More and more timely follow-up information and coordination activities could help ensure that project activities are being developed as planned. New communication activities and vehicles (newsletter, video reports, etc.) should be considered along with adjustments in current communication activities and procedures (e.g., translate quarterly report to Spanish, add a follow-up section or create a separate newsletter in Spanish for quarterly distribution, add a short-term communications consultancy, etc.). PAHO should take responsibility for distribution of quarterly reports and follow-up documents, even to the USAID missions.

(11) In addition to the existing training and education activities, it is recommended that national short courses or workshops be organized with the instructors travelling from international training centers. National courses have the virtue of allowing more local persons to participate and of dealing directly with local conditions.

(12) The Project should be extended for a second four year period beginning in March 1989 and except where there are budgetary carry overs (e.g., possibly in research), new resources should be made available.

Lessons Learned

One of the most important lessons learned relates to the pacing and nature of organizational change. The subtantive organizational shift from eradication to control and from a vertically organized to an integrated program is a slow process, requiring years of training, technical assistance and other support activities to ensure a successful transition. There are no short cuts. While there is no doubt that it is a profound and necessary organizational change to which the Project has appropriately addressed its attention, it will require the extension of project activities beyond the current March 1989 deadline.

Though known to some extent before hand, Project experience further demonstrates that a sub-regional approach requires extraordinary attention to communication and coordination, including follow-up communication/coordination, to take full advantage of the opportunities.

The selection of PAHO to coordinate and implement the sub-regional Project is an appropriate one, as PAHO has the international stature, experience and capacity to effectively implement such projects.

Strengthening research capacity and supporting research activities is also a slow process that has no easy short cuts.

III. Attachments

A. Sub-region

1. Evaluation Reports

(1) Malaria

Summary

The objectives of the sub-regional malaria control component of the Project are to strengthen malaria control programs, and to establish and institutionalize a training and operations research program for mosquito-borne diseases. To attain these objectives, workplans were made with the aim of strengthening national and sub-regional malaria control programs within the general health services. Major elements of these plans included training (including the development of teaching aids and manuals), research, and technical assistance, including support for technical and border meetings of malaria staff among the countries, technical and administrative support, and the provision of relevant supplies and equipment.

Sub-regional Program Context

Institutionally, the malaria programs have historical depth: all the countries of the sub-region initiated their malaria eradication programs during the 1958-1961 period. At the time of their founding, eradication of malaria was the common organizational objective. A command-type vertical organization--The National Malaria Eradication Service, SNEM--was created in every sub-regional country. Insecticides were the principal measure used to interrupt malaria transmission. Eradication proved to be an elusive objective, though there were considerable advancements in limiting mortality and controlling morbidity. By the 1970's, the rising costs of operations and increasing technical problems obliged the countries to revise the objective from eradication to control and to adapt their strategies accordingly.

For the purposes of malaria control, the vertical structure of the SNEM was no longer necessary. Moreover to assure long-term continuation of malaria control activities, it was argued that the malaria program be integrated within the primary health program of the general health services. The process of integration has been slow because the general health services are not prepared to assume the responsibility, while the

malaria service is reluctant to integrate for fear that the malaria program may not function under the current development of the primary health care program. In this respect, the Project has helped the countries in the sub-region to prepare the professional staff of the general health services for an eventual incorporation of the malaria control program.

The shift from eradication to control also implies other far reaching program implications, not the least of which is the difference between time limited and time limitless methods. Whereas eradication implied a finite period of time, control is open-ended, implying long-term maintenance of complementary methods. The chemical tools have largely been played out as effective means of malaria control, due in no small measure to their extensive agricultural use, but also due to their use as finite eradication measures.

There is considerable vector resistance to insecticides, which extends along the Pacific coast lowland from Nicaragua to southern Mexico, where for two decades a large quantity and variety of insecticides have been used in large-scale commercial cotton production. As a result of this pattern of use, virtually no common insecticides has any effect in interrupting malaria transmission. Furthermore, the ecological conditions are very favorable for mosquito breeding and there is massive movement of migratory labor to pick the cotton which adds to the problem. These and other factors have contributed to a great potential for malaria transmission along the Pacific coast. In addition to early detection and timely treatment of the malaria cases, it is important to try other control measures, such as source reduction, biological control (including the expanded use of larvivorous fish), anti-larval measures and even personal protection. To be fully effective, these control activities require close sub-regional coordination.

Another sub-regional problem is the displacement of large numbers of people, particularly rural people--at least a half million in El Salvador alone--within and across national frontiers. Many of these persons suffer from malaria and introduce the disease to new areas, creating potentially epidemic situations. The Project has helped organize a series of border meetings, namely between Guatemala-Mexico, Nicaragua-Honduras, Costa Rica-Panama, Panama-Colombia, Guatemala-Honduras-El Salvador. These meetings help in the exchange of epidemiological information and the coordination of anti-malaria activities along and across international borders.

The principal control measure throughout the sub-region is early case detection and proper treatment. These activities are carried out through a network of voluntary collaborators located in rural areas and through health institutions in villages and towns. As malaria is a rural disease, the voluntary collaborators play a very important role in the malaria control program. In 1986 and 1987, the Project provided funds to train 1,900 of the total of 16,600 voluntary collaborators.

The number of malaria cases registered in the sub-region in the last five years is summarized as follows:

Country	Population in malarious area in thousands	Number of malaria cases registered				
		1983	1984	1985	1986	1987
Belize	182	4,595	4,117	2,800	2,779	3,258
El Salvador	4,934	65,377	66,874	44,473	23,953	12,834
Costa Rica	771	245	569	734	790	883
Guatemala	3,460	64,024	74,132	54,958	42,609	57,662
Honduras	4,370	37,536	27,332	33,828	29,130	19,066
Panama	2,192	341	125	126	1,060	1,195
Total	15,909	172,118	173,149	136,919	100,321	94,898

Training

Training was the major intervention strategy and included activities at the national, sub-regional and regional levels.

At the national level, training was organized at three different levels: (a) one week courses for professional staff of the general health services; (b) three day courses for intermediate level staff (inspectors, auxiliary

health personnel) and; (c) one to three day workshops for voluntary collaborators at the community level.

The one week course was very well received by the medical officers, nurses, engineers and inspectors of environmental sanitation and other senior staff of the general health services. In Honduras, the training program accelerated the process of integration of the malaria service into general health services, a process that was successfully completed by the end of 1987. The workshop for voluntary collaborators is considered very important because it is not only a technical orientation, but also a recognition of their service and an incentive for them to continue malaria control activities.

For training professional staff of the general health services, five volumes of epidemiology modules--"Principles of Epidemiology for the Control of Malaria"--were utilized. These modules were developed by PAHO/HQ using Project funds. The modules were highly appreciated by course participants, though for some without sufficient preparation they were a considerable challenge. This appears to be more a problem of selecting course participants than any difficulty with the modules as such.

For training intermediate health personnel and voluntary collaborators, no specific manual has been prepared for the sub-region, though this should be seriously considered to take advantage of economies of scale and the diverse resources within the sub-region. However, each country prepared its own manuals or guides which vary considerably from one country to another. The booklets prepared by Guatemala on malaria, sanitation, maternity and child health care, diarrhea and vaccination seem to be simple enough and yet illustrative for the voluntary collaborators. These booklets could be used as a model to develop manuals or guides for the health personnel at the intermediate level and voluntary collaborators in the sub-region.

At the international level, training was organized for intermediate and professional staff

Intermediate technical staff from the malaria services were trained in various short courses held at the Universities of Panama and South Carolina and in Guatemala, Honduras and Costa Rica. These courses were of one week to three months duration, dealing with administration of malaria control programs, as well as specific technical issues, including use of insecticides, vector control, microscopic diagnosis of malaria,

maintenance of spraying equipment, medical entomology and health education. These courses are considered to be very practical and useful for field operations. Most countries are considering replicating the sub-regional courses at the national level for other technical staff who were unable to participate in the international courses.

For professional staff, fellowships for two academic courses were supported by the Project. The ten month specialist course on malaria and environmental sanitation, held in association with the University of Carabobo in Venezuela, is well-known throughout the Americas. In 1986, the curriculum was revised to include the epidemiology of vector-borne diseases. Since 1985, eleven sub-regional candidates were graduated from this course, four from the malaria services and seven from the general health services. The course may also lead to a masters degree in either epidemiology of vector-borne diseases or environmental sanitation, if a thesis is presented to and approved by the University within a year after graduation. Very favorable comments on the value of the course were received from the graduates we interviewed. The course could be more fully utilized, especially by professionals from the general health services.

The other academic course is medical entomology, given by the University of Panama, in Panama City. Since 1985 the Project has provided direct support for this course by financing fellowships, and providing equipment and supplies. In addition, the PAHO entomology group has been involved in lecturing and laboratory work. With support from the Project, the University of Panama is now well established to train professional entomologists for all of the Americas, if students are provided with fellowships. Given advances at the University, it is recommended that PAHO plan its disengagement from teaching responsibilities within a reasonable time frame. Moreover, it should be noted that of the seven graduates from the 1983-85 and 1985-87 courses, only one is with the malaria and vector control program, while the rest are at universities and other institutions. In the future, hopefully more graduates will come from the malaria and vector control programs.

Research

The sub-regional research project for the study of the ecology, biology and vector capacity of A. albimanus on the Pacific Coast of the sub-region is behind schedule. In 1987, a sub-regional meeting was held in Tapachula, Mexico with the entomologists and epidemiologists of the malaria services. Over a period of two weeks, individual research protocols for

each country were prepared. These country protocols were presented to and approved by the PAHO Research Committee in Washington, D. C., November 23 and 24, 1987. Research funds have been sent to Guatemala and El Salvador in early 1988 where the work has been initiated, though Guatemala actually began the research in 1987 using government funds.

In addition to the sub-region-wide A. albimanus research, each country has developed and some have begun to implement their own research projects in accordance with other national problems. These country research projects include a sero-epidemiological study in Costa Rica, a study of vector capacity of A. darlingi in Honduras, a study of different collective treatment approaches in Guatemala, a study of A. albimanus in relation to source reduction and larvivorous fish in El Salvador, and a study of socio-economic factors among the indigenous Cuna of Panama. PAHO vector control advisors continue to play a key part in strengthening national research capacity and we anticipate that this will continue to be an area that requires priority attention for research to flourish.

Other Project activities include technical and administrative support, financing and communications for sub-regional meetings, the provision of relevant supplies and equipment, and the distribution of scientific publications to the countries of the sub-region. The sub-region-wide meetings are particularly important for exchanging epidemiological information and for coordination of anti-malaria activities. Over the last three years, the meetings at the PAHO/HQ level include three technical advisory meetings to review and approve the annual work plans. In addition, there were two research committee meetings to discuss and approve subregional research protocols.

B. Country Report

BELIZE: MALARIA

Summary

The training program described under the Project was implemented only in part. There is a shortage of professional staff in health services and no candidate was found to attend the training course on malaria and other insect-borne diseases in Venezuela as originally planned. During the last three years, 13 fellowships were awarded to malaria and Aedes programs for their mid-level staff (inspector level) to receive training in vector control and program administration. However, under the current health structure and working conditions, the utilization of their acquired knowledge seems to be limited.

Belize does not participate in the sub-regional A. albimanus research project. Besides, at present the Malaria Service is not ready to undertake research activities.

National Program Context

In Belize, the malaria program has been carried out through a vertical health service organization directed by a central office. Although the Director of the Malaria Service is also the Director of Health Services, anti-malaria activities are not integrated at the district level. However, the malaria supervisors always maintain close contact with the district medical officers. The same is true of the Aedes aegypti program which is a separate, vertical health service under the Environmental Sanitation Bureau. Integration of the two programs--Malaria and Aedes aegypti Services--into a single vector control service is under consideration for some time in the future.

There are six medical districts, each with a district medical officer, 12 nurses and one sanitary inspector. The majority of the medical districts has a laboratory technician, but all malaria slides are sent to the Malaria Service in Belize City for examination. For the malaria program, the

country is divided into three sectors, each sector carrying out anti-malaria activities in two medical districts. Each malaria sector has a district supervisor, four evaluators and a spraying squad of 11 workers.

The number of malaria cases registered for Belize was between 28 and 99 or less than one case per 1,000 inhabitants per year for eight consecutive years, from 1968 to 1975. However, malaria incidence has steadily increased since 1976, having reached 4,117 cases or 25.7 cases per 1,000 inhabitants in 1984. In response, the malaria control program was intensified in 1985, applying DDT house spraying in the most affected areas. The first cycle covered 14,527 houses while the second cycle only 8,033 houses. In 1986, with bilateral financial assistance from USAID and a donation of DDT from Mexico, spraying coverage was further extended to include the whole country except Belize District and other densely populated urban centers.

The population living in the area under spraying protection is 76,000 or almost one-half of the entire national population of 170,000. Although total coverage of the selected areas was the objective in 1986 and again in 1987, the actual coverage ranged from 67% to 86% in the last three spraying cycles, principally due to refusals.

There are 274 malaria notification posts, comprised of 52 health units and 222 voluntary collaborators. Over the last three years, the number of blood slides taken every year has been equivalent to roughly 13% of the population. The number of malaria cases diminished to 2,800 cases or 13 per 1,000 inhabitants in 1985, 2,779 cases in 1986, but increased to 3,258 cases in 1987. The current anti-malaria measures do not seem to be fully effective to reduce malaria incidence, although DTT coverage is fairly extensive. The causes of this ineffectiveness need to be determined.

Training

The Director of the Malaria Service is the only professional in the program. He is assisted by a group of mid-level staff who are qualified and capable of carrying out malaria control activities. However, as both Director of Health Services and the Malaria Service, he has very little time for the

malaria program. As the government has recognized the need to train new professionals, it planned to send a medical officer to attend the course on malaria and other vector-borne diseases in Venezuela, using Project financial resources, but no candidate was found over the last three years. However, the Permanent Secretary indicated the possibility of recruiting a biologist to be trained in medical entomology at the University of Panama in 1989. At least one full-time malariologist or epidemiologist is needed to develop a more efficient malaria control program.

The Project awarded 13 fellowships to the malaria and Aedes programs for their mid-level staff (inspector level) to study entomology, health education, research methodology, technical and program administration and maintenance of equipment for insecticide applications. The courses ranged from one week to three months in duration. According to course participants we interviewed, the courses were useful and have the promise of paying off in the future. However, under current working conditions of the Malaria Service, the utilization of the knowledge acquired from the courses seems to be limited.

Regarding national level training courses, the Malaria Service continues to organize twice a year workshops for its field personnel, utilizing its own resources. Recently, a denominational organization called Health Talents International collaborated with the Malaria Service in training and re-training voluntary collaborators and Community Health Workers in the detection and treatment of malaria cases. A simple illustrated booklet, called "The Story of Ramon and His Family" was published and distributed for this training and for subsequent didactic use. The malaria personnel also continue to participate in workshops and seminars organized by the district medical officer for his staff and community health workers.

Research

Belize is not included in the sub-regional research project on the ecology of A. albimanus, which is focused on Pacific coastal areas. Belize has only an Atlantic coast, where the vector is less exposed to insecticide pressure common to many Pacific coast areas. Also in other respects, Atlantic epidemiological conditions are quite different from those of the Pacific coast and therefore the problems and research priorities are also

different. Moreover, eith a single malaria professional and a limited number mid-level staff all of whom are fully engaged in field operations, it is very difficult for the Belize Malaria Service to undertake operational research programs.

B. Country Report

HONDURAS: MALARIA

Summary

The Project training program is on schedule and has obtained positive results. Through training courses at the regional and area levels of the Ministry of Health, the Project accelerated the process of integration of the vector control (vc) program into general health services, a process that was successfully completed by the end of 1987. In addition, the Project has laid the basis for the regional health staff to organize local training courses for community level voluntary collaborators in malaria control and other health activities, provided the necessary funds are made available.

The Project has also provided fellowships for the technical staff of the vc and other divisions to receive advanced training in vector control, program administration, epidemiology, entomology, and health education. There is no doubt that the vc division will be strengthened in its technical and management capacity through such training..

With regard to research activities, there has been a delay in the elaboration and approval of the sub-regional protocol and as a result the research program is behind schedule.

National Program Context

Honduras has experienced dramatic organizational changes in its malaria service. By ministerial decree in January 1979, the National Malaria Eradication Service was abolished and all field workers at the health area and sector levels were immediately dismissed. At the central level, key staff were retained to form a technical division in the Ministry of Health. At the regional level, only regional inspectors and microscopists were kept in service. At the community level, contact with the 5,000 voluntary collaborators practically ceased and the program stagnated. This situation continued for more than two years as malaria incidence was on the rise.

As a result of national policy changes, by mid-1981, new field workers were recruited and trained, and malaria control activities were resumed. On an interim basis, the program was vertically directed by the vc division, allowing a transition period for the regions to prepare their staff and to provide physical facilities to absorb the vc program into health services. However, the process of integration was slower than expected.

Honduras is divided into eight health regions, which are subdivided into a number of health areas, which in turn are subdivided into health sectors. (Tegucigalpa is a health region, but has no malaria.) The vc program which includes malaria is integrated into the health services and is directed by the chief medical officer of the region who is assisted by the regional inspector of the vc program. In each health area, there is a vc inspector, and in each sector an evaluator, who is responsible for maintaining periodic contact with voluntary collaborators and community health workers, in malaria case detection and treatment and in promoting basic health services. At the area level, there is a group of field workers who have been trained in multiple control activities, such as application of residual house spraying, space spraying, anti-larval activities, mass drug administration and other health activities in accordance with the needs of the health area.

The basic malaria control activity is the provision of anti-malaria drugs to the population as widely as possible. This program is conducted through the network of 655 health institutions and 5,667 voluntary collaborators. In some selected localities malaria control measures are applied to reduce transmission or to lower malaria incidence. The measures being applied include residual house spraying with Fenitrothion, mass drug administration every 14 days for six cycles, five-day massive radical cure treatment, three-day presumptive treatment in remote localities, space spraying with Fenitrothion and anti-larval operations. In June 1986, the vc division received two back hoes from USAID for source reduction activities. Presently they are scheduled to operate in three localities with a total population of 100,000.

For each anti-malaria measure to be applied by the Health Region, the vc division has provided a set of criteria for selection of localities and methodologies under different ecological and epidemiological conditions. In addition to dictating norms and criteria, the vc division is responsible for providing technical assistance to solve problems and to participate in operational research if needed. As a result of the control efforts, there has been a steady decrease in malaria cases since 1982: the number of

malaria cases registered for 1982 was 57,482 or 14.4 per 1,000 inhabitants, while that for 1987 was 19,066 or 4.2 per 1,000 inhabitants.

Training

The start-up of the Project in March 1985 was timely. The Project helped accelerate the organization rebuilding and integration processes, which had been lagging since 1979. In 1986 and 1987, seven training courses of one week duration were held at the regional level on malaria and other vector control topics, using the epidemiology modules developed by PAHO/HQ. Each course was attended by seven to nine professional staff of the regional and area offices, including medical officers, sanitary engineers, nurses and biologists. These training courses generated considerable interest on the part of the health service personnel and by the end of 1987, all eight health regions in the country completed integration of the vc program into general health services.

Following the training of the professional staff, two seminars of one week duration were organized for malaria inspectors and area nurses to develop training programs for voluntary collaborators, using a "Manual for Instructors" developed by the vc division. The objective of the training courses for the voluntary collaborators was to improve their knowledge in malaria control and to promote their interest in community health activities. Over the last two years, 16 training courses were organized in seven health regions, each with 25 voluntary collaborators, using "A Handbook for Voluntary Collaborators", developed by the vc division. In terms of the needs of the country, this number represents about 7% of the voluntary collaborators, but it is the experience and motivation that are considered of value for future training activities.

In one of the health areas we visited (Catacamas, Olancho department, which registers among the highest incidence of malaria in the country), a complete integration of malaria and basic health service was observed. In visiting a rural community in the area, one voluntary collaborator expressed her appreciation for the training she had received. In addition, the development of the manual and guides by the vc division is also a valuable product of these training activities.

In addition to strengthening regional health services for vc control, the Project has provided fellowships for the technical staff in malaria and health services to receive advanced training at various international training courses previously arranged by PAHO/HQ. The fields of training include malariology, vector control, medical entomology, diversified vector control techniques, program management, maintenance of insecticide application equipment and health education. Honduras has taken advantage of all international courses offered under the Project. In total, 26 fellowships were awarded, 21 for the vc division and five for other divisions of the Ministry. This training program seems to have generated much interest among the participants in diversified vector control measures and in planning field trials.

Research

Under the Project, a study of the vector ecology of A. albimanus was proposed and a general research protocol was drafted for the Central American sub-region. Each country has made its own protocol in accordance with national epidemiological and ecological conditions. However, in Honduras the research was delayed partly because the preparation and approval of the protocols was late and partly because sub-regional coordination was not timely. Presently, another research project is underway to determine the vectorial capacity of A. darlingi which was found in good number in La Ceiba area where malaria transmission has been persistent. This research project is being carried out with national resources.

B. Country Reports

GUATEMALA: MALARIA

Summary

Over the last three years, the national training courses planned for Guatemala under the Project were carried out on schedule and consisted of 15 courses for professionals of area and district offices, two seminars for district nurses, inspectors and evaluators, one refresher course for area microscopists and six courses for voluntary collaborators. All the international courses offered by the Project were utilized to train the professionals and mid-level staff of the Malaria Division and General Health Services. As far as the training program is concerned, Guatemala has complied with what was planned under the Project.

However, no immediate effects have yet been observed as to how the training program may have changed the organization of the Malaria Service, improved the methodology of the malaria program or contributed to the strengthening of community health services. It was reported that a large majority of the trainees have shown a high level of interest and enthusiasm during the courses, but no follow-up actions were observed after they returned. It was also reported that a clear-cut political decision regarding the future organization and responsibility of the malaria program would be necessary to implement the goals and objectives of the Project.

Regarding the sub-regional research project on the ecology of A. albimanus, Guatemala already initiated the program in October 1987. Having had serious problems of vector resistance of various insecticides, Guatemala continues its efforts to test new insecticides and to monitor the susceptibility of the vector to the insecticides now being used. A research project on the use of alternative methods for malaria control in problem areas is being drafted and is to be presented at the end of February 1988.

National Program Context

The Malaria Service in Guatemala has been a vertical organization since the program was initiated in 1959. Currently, it is called the Malaria Division and is located in the General Directorate of Health Services. The Division has nine zones and 34 sectors in the country. The area of operation of a zone or a sector do not coincide with that of the health services which has 24 health areas and 200 health districts. There is coordination between the Health Service and the Malaria Service, but this is largely confined to the exchange of information.

At the central level, the Malaria Division has three technical and one administrative departments. One of the technical departments is the Malaria Service which has retained its traditional name, National Malaria Eradication Service (SNEM). Since SNEM has been the principal technical department in the Malaria Division, it has the largest number of professionals, i.e., four medical officers (malariologists) and one entomololgist and it is directly under the chief and sub-chief of the Division. In August 1987, there was a rather drastic change of the professional staff of the Division. The chief and sub-chief (both malariologists) plus three malariologists from SNEM were transferred out of the Division to other health services. They were replaced by three medical officers transferred from other health services. There are currently two vacant posts for malariologists. Of the three new medical officers, two received training at the malariology and other vector-borne diseases course in Venezuela in 1986 and 1987.

The principal malaria control activity is the detection and treatment of malaria cases through the network of 6,500 voluntary collaborators and health institutions. Specific malaria control measures are applied only in areas with high malaria endemicity or in areas with epidemics.

The malarious area of the country is divided into three ecological zones: Northern, Central-Eastern, and Southern Zones. In the Southern Zone on the Pacific coast, residual house spraying with Deltametrin has been applied twice a year since 1981 in selected localities with high endemicity of malaria. The population protected and area covered by the insecticide varies from one year to another in accordance with epidemiological needs and availabilty of the insecticide. However, on average, about one-quarter to one-third of the total population of 1,078,000 are included. The susceptibility of the vector to Deltametrin has been constantly monitored

and as of this date, the vector continues to be susceptible. In the Northern Zone with a total population of 1,013,000, residual spraying with Deltametrin and Fenitrothion was carried out with less regularity. However, in view of the high malaria incidence in 1987, which represents 64.8% of the total cases registered in the country, a plan is being drafted to increase the spraying coverage with Fenitrothion. In the Central-Eastern Zone, which has a total population of 1,240,000, malaria transmission exists only in certain valleys and therefore, little insecticide has been used. During the period 1984-1987, the entire zone was under epidemiological vigilance without insecticides, but malaria incidence was on the rise. In 1987, two larvicides--Baytex and BTI--were applied on an experimental basis in two localities with 25,000 and 5,927 inhabitants respectively. The results were highly satisfactory.

Elsewhere in the country, the new insecticides Bendiocarb, Cyflutrine and Acetellic were used in experimental field trials. Mass drug administration is rarely used as a routine measure, but rather as an emergency tool. However, it may be used in the Northern Zone in 1988, in combination with Fenitriothion spraying in order to reduce the number of malaria cases. Other control measures such as antilarval operations and biological contol have not been tried on a significant scale.

The malaria situation seems to have deteriorated in 1987, especially in the Northern Zone. Shortage of insecticides is considered as the principal reason for the increase in malaria incidence, but the sudden change in technical leadership at the central level may have also contributed to the resurgence. The number of malaria cases registered for 1986 was 42,609 or 12.78 per 1,000 inhabitants, compared with 57,662 or 16.67 per 1,000 inhabitants in 1987.

Training

Under the Project, training courses were organized for the professional staff of General Health Services to receive orientation on technical and administrative management of the malaria program. The objectives of this training are to promote interest and to enhance the skill of program management, so that a closer coordination and/or an eventual integration of the two health services may be achieved. In the last three years, 15 training courses were held in 15 health areas with participation of a total of 300 key professional staff of the areas and districts, i.e., chiefs

of area and districts, other medical officers, nurses, engineers, inspectors, biologists, health educators, etc.

The epidemiology modules developed by PAHO/HQ were distributed and used in this one-week course. The course was generally well received by the participants and the epidemiology modules were highly appreciated. However, apparently no follow-up activities were exercised after the courses, either by the malaria division or by the General Health Services. No noticeable changes have been observed in the malaria program in terms of its organization or its control methodology. In 1988, eight more courses have been planned for the remaining nine health areas.

At the district level, two seminars (three days each) were conducted in 1986 for the district nurses, inspectors and evaluators with the objective to prepare them as instructors for the training courses for voluntary collaborators. Each seminar was immediately followed by three such courses (two days each). In total, 500 collaborators were trained in 1986. This number represents 7.7% of the total collaborators in the country. Though none were trained in 1987, plans call for two more seminars and six more courses with 300 voluntary collaborators in El Peten and Alta Verapaz (Northern Zone) in 1988.

The objectives of these training courses are to refresh the knowledge of the voluntary collaborators in malaria control activities and to provide orientation for other health programs. So far, no follow-up activities have been carried out and therefore, no information is available on the performance of those collaborators who participated in the training courses in 1986. For those training courses, the Malaria Division prepared a manual for the malaria personnel and five handbooks for the collaborators: "Malaria", "Las Vacunas", "La Diarrea", "Saneamiento Ambiental", and "Los Cuidados de la Madre y su Hijo". The preparation of the manual and handbooks is also part of the Project.

The microscopists in the health areas were given refresher training in diagnosing malaria, with the objective that they participate in the examination of malaria slides and eventually take over this responsibility when the malaria program is decentralized. Two courses, each of two weeks duration, with 14 microscopists, were held in November-December 1987. It is too soon after the course to evaluate impact upon job performance. There are 160 health area microscopists in Guatemala and eventually all of them will receive refresher training. Four more courses have been planned in 1988. For SNEM field personnel, a one week

epidemiology course using the epidemiology modules was conducted in 1986 with the participation of 25 sector chiefs.

In addition to carrying out an active national training program, Guatemala was the host country for the meetings of the 1985 Directors of Malaria Service in Central America and Panama and also host for two international courses sponsored by the Project, i.e., a three month course in 1986 on malaria program technical and administrative management and a 1986 two week field practice for a refresher course on medical entomology as a continuation of a four week theoretical training in Panama. Furthermore, Guatemala sent some technical staff of the Malaria Division and other health services for advanced studies in malariology, entomology, vector biology and control, and health education. These courses were pre-arranged by PAHO/HQ and funded by the Project. Over the last three years, 32 fellowships were awarded of which 23 were from the Malaria Division and nine from other health institutions. The selection of the candidates for study was done at the Ministry level.

There is no doubt that these training courses will benefit Guatemala and improve the efficiency of technical and administrative management of the malaria program. However, in some cases, the selection of the candidates was not made on the basis of technical needs and therefore, the utilization of their acquired knowledge cannot be foreseen in the immediate future.

Research

For the sub-regional research project on A. albimanus, a two week meeting of the entomologist and malariologist of the five Central American countries and Panama was held in Tapachula, Mexico in August 1987. At this meeting, the research protocol was discussed and an individual country research protocol was prepared. In Guatemala, the proposed study was initiated in October 1987 on adult mosquito habitats. Observations on anopheline breeding habitats will begin in February 1988. Another study has been proposed to the Project, namely the use of alternative methods of malaria control in problem areas, principally on collective treatment using different schedules of treatment. The protocol is under preparation and will be presented shortly. With its own resources the Malaria Division is conducting complementary studies on new insecticides, such as Bendiocarg, Baytex, Actellic and even BTI.

B. Country Reports

EL SALVADOR: MALARIA

Summary

The malaria control strategy in El Salvador has shifted from heavy reliance upon insecticides to a more integrated approach, emphasizing source reduction operations and timely treatment of malaria patients. The emphasis on diversified vector control measures requires a better knowledge of epidemiology, improved preparation of technical personnel at all levels, and a tighter organization of the network of voluntary collaborators. In this respect, the Project has made significant contributions in providing training for the technical personnel of the Malaria Division and of the voluntary collaborators in the communities. The Project has contributed to strengthening the malaria program, complementing USAID bilateral assistance, which provides the necessary insecticides, spraying equipment, vehicles, laboratory supplies and antimalaria drugs. There is an effective and close working relation among the technical staff of government, USAID, and PAHO in planning, training and operational research.

Under the Project, all local training courses for 1987 were carried out as planned during the year. There were 125 key staff of the General Health Services and the Malaria Department trained in five courses using the PAHO-designed epidemiology modules. The microscopists of the health regions, 40 in total, were given refresher training in the diagnosis of malaria parasites so that the blood slides taken at the health institutions and hospitals can be immediately examined. One-third of the 2,700 voluntary collaborators in El Salvador received refresher training in malaria, principally in the preparation of blood slides and treatment of malaria patients.

All international training courses offered under the Project were utilized. El Salvador has been able to select and send six medical officers from the health regions to a one year course on malaria and other vector control measures in Venezuela. These professionals will no doubt benefit future malaria programs when the integration of malaria and health services programs takes place. In addition, there were 21 fellowships awarded to

mid-level staff to attend various short training courses lasting from one week to three months in various fields related to malaria and vector control.

In relation to research, in May 1987 the Malaria Department took the initiative to launch a study on vector ecology in relation to a large-scale source reduction project in Ticuizapa, a Pacific coast area. In addition, the sub-regional research on the ecology and biology of A. albimanus is ready to begin, pending the availability of research funds. Also research on local larvivorous fish as a possible supplementary measure to source reduction activities is being planned.

National Program Context

Until recently, El Salvador has consistently registered the highest number of malaria cases among all the countries of the sub-region. The highest number ever recorded for the sub-region and for El Salvador was 95,835 cases or 30.35 per 1,000 inhabitants in 1980. Ecological and epidemiological conditions in El Salvador, the second most populous country in the sub-region, favor malaria transmission. There is serious vector resistance to insecticides, especially in the Pacific Coast plain, as a result of heavy agricultural use of insecticides, particularly in cotton production. Practically all common insecticides are useless to interrupt malaria transmission, except for a few localities where Propoxur residual spraying still can be used with some effect.

However, since 1985, malaria incidence has declined rapidly, reaching the lowest number ever recorded in 1987, with 12,834 cases or 2.6 per 1,000 inhabitants. The reduction of P. falciparum infection--from 4,373 cases in 1985 to 598 in 1987--was particularly significant. (Technical criteria regarding the incidence of malaria are largely limited to the area where the malaria service has influence.) Many factors have probably contributed to this reduction in malaria, such as lower rainfall and therefore fewer and shorter-lived vector breeding habitats, and a reduction in cotton acreage and therefore fewer seasonal migrating farm laborers, whose impoverished and crowded housing conditions favor malaria transmission. Above all, the malaria control program itself has intensified the radical cure treatment and diversified control measures which have been applied in a proper and timely manner. However, other factors still favor malaria transmission, such as the large numbers of displaced persons, which could

rapidly lead to higher levels of malaria.

El Salvador is stratified into four major endemic zones: hyper-endemic; endemic, hypo-endemic and non-malarious. The hyper-endemic zone includes those localities between sea level and 300 meters and with 60 or more malaria cases found in the previous year. In 1987, the hyper-endemic zone included a total population of 888,090 or 18% of the national population, but was responsible for 90.3% of all the malaria cases registered. The major malaria control efforts are concentrated in this largely coastal zone, i.e., weekly visits from the evaluator to the voluntary collaborators and radical cure treatment of the laboratory confirmed cases within eight days after the presumptive dose is given.

In addition to this basic control activity, specific control measures are applied in selected localities with high malaria incidence. In 1987, for example, mass drug administration was given every 14 days for five cycles to a total of 104,000 persons, residual spraying with Propoxur for three cycles to 33,000 houses, ULV space spraying with pryethrum in populated towns and larviciding with Abate over 489 breeding places during the dry season. Source reduction works, such as drainage and landfill, are also major activities in the Pacific coastal areas. During the last five years, 169 source reduction projects were completed, protecting about 100,000 inhabitants.

The malaria program in El Salvador is still vertically directed by the Department of Malaria under the Division of Environment which is located in the Health Directorate. For field operations, El Salvador is divided into five zones which coincide with five health regions of the Health Services. Although the Malaria Service is not integrated into the General Health Services, in practice, there has been a close working relation between the two services at the region and zone levels. For example, the malaria field personnel, after receiving special training, participated in the vaccination program organized by the health regions (three times a year since 1984) and the health institutions collaborate in case detection and treatment of malaria patients. The process of integration has been deliberate, perhaps slow, but a faster pace would not create a durable organizational change for either the malaria program or the health services. The personnel of both services need to be fully prepared for the integration to be effective. The malaria control strategy has been shifted towards less dependence of insecticides and greater use of source reduction operations and more timely treatment of malaria patients. These activities require constant contact with the community and close coordination with other

institutions, including non-government organizations (ngos), with special reference to the large number of displaced persons. The regional health level does not yet seem ready to assume full responsibility for these extensive field operations.

Training

All local training courses planned in the Project were conducted during 1987. For the key staff members of the health regions and the malaria zones, five courses of one-week duration were held in each of the five respective regions, using the epidemiology modules. Each course was attended by 25 professionals, including medical officers, nurses, inspectors of environmental sanitation, engineers, health educators and the malaria zone chief. For most of the professionals of the health region, this training course was the first opportunity to receive an orientation on technical and administrative management in malaria control. The course was well received and the epidemiology modules were very much appreciated. The effect of these courses is not yet to be seen, but definitely the regional health staff have shown more interest in malaria, as six medical officers have been sent to take a full one-year course in malariology and vector control in the last two years.

For the laboratory technicians of the health regions, two one-week refresher courses on diagnosis of malaria parasites were given. In total, 40 microscopists received this training. It was felt that one week was too short and that the microscopists in the Social Security Institute should also be invited to the next courses planned for 1988. For the voluntary collaborators, 26 one-day courses were conducted with 900 participants in total. This course was a refresher training in the malaria program.

Of the 2,700 voluntary collaborators in El Salvador, 900 have already received training, leaving 1,800 for whom 50-60 courses are planned in 1988 and 1989 to complete the training program. The network of voluntary collaborators is considered as a basic malaria service to the entire population even, it is said, in areas of armed conflict. The refresher training for collaborators is not only a technical session but also a recognition and incentive for them to continue their collaboration. A manual for voluntary collaborators was distributed in the course.

All international training courses offered in the Project were utilized to train professionals and mid-level staff of the General Health Services and the Malaria Department in the last three years. In 1986 and 1987, three epidemiologists from three health regions attended the one-year course on malaria and other vector-borne diseases in Venezuela and three more epidemiologists, two from the other health regions and one from San Salvador municipality, are presently taking the same course in Venezuela. After the course these medical officers would definitely play a major role to assume the responsability of malaria control when the integration takes place. However, it was felt that more professionals should receive a full training in malaria and vector control to assure that there are always some trained professionals at the regional level, as turn-over or transfer of personnel is rather frequent.

Other short courses, from one week to three months duration, were offered in the United States, Costa Rica, Panama, Guatemala, and Brazil on vector control, epidemiological vigilance of communicable diseases, medical entomology, laboratory techniques, application of insecticides and maintenance of spraying equipment and health education. For these short courses, 21 fellowships were awarded, five to General Health Services and 16 to the Malaria Department. The majority of the course participants were mid-level staff. These courses are considered to be very valuable for field personnel to acquire a broader scope of basic knowledge on diversified malaria control, in view of the changes in control strategies.

Given El Salvador's advances in source reduction, there is an opportunity for other countries of the sub-region to attend a seminar on the subject held in El Salvador. One day of field observations of some of the drainage projects, followed by one or two days of discussion would be a useful format. Follow-up documents, possibly including video cassettes and/or other materials, for use in home countries should be given appropriate consideration as a multiplication and didactic strategy.

Research

The Malaria Department has planned a large-scale source reduction project in Ticuiziapa, a coastal resort area where thousands of people come to reside during the weekends and holiday seasons. The area is also located near several cotton producing plantations where large numbers of season farm workers arrive from other parts of the country to harvest the crop.

Two large lagoons located between the ocean beach and the low coastal plain and foot hills provide a good breeding place for A. albimanus. During the dry season a small river, which normally flows into the ocean, is blocked by sand, causing the fresh water to be diverted into the lagoons. With the seasonal addition of fresh water lowering salinity levels, the lagoons become extensive breeding place. Malaria transmission has been a problem among the permanent village residents and the numerous seasonal visitors who become infected and spread malaria to other parts of El Salvador. The project is intended to ensure that the stream will continually empty directly into the ocean, during both the wet and dry seasons, without dependence on significant recurrent costs or organizational capacity, such as hand labor to dig a channel through the sand barrier every year. Thus lagoon salinity level will always be prohibitively high for mosquito breeding.

To evaluate the impact of this project on the anopheline population and to provide base-line information for future monitoring activities, a pre-construction research program was initiated in May 1987, gathering data on adult and larva mosquito density, malaria incidence among permanent residents, meteorological conditions, lagoon salinity, and associated flora and fauna. The study has been planned to begin one year prior to the beginning of construction and to continue during and after the completion of work. A research protocol, titled "Ticuiziapa Lagoon, Evaluation of a Vector Source", has been prepared for this purpose. As a part of the maintenance activities for the drainage canals already constructed and to supplement the effects of source reduction, a study of indigenous larvivorous fishes is also being planned.

The sub-regional research project on the ecology of A. albimanus for which the protocol was already prepared and study site selected, is pending the availability of research funds.

B. Country Report

COSTA RICA: MALARIA

Summary

With international training as a high priority, Costa Rica has utilized all the international training courses offered by the Project. Altogether 27 fellowships were awarded to professionals and mid-level staff during the period October 1985 to February 1988. Three Costa Ricans attended academic courses leading to a masters degree and 24 participated in short courses of one week to three months duration. Costa Rican authorities observed that these courses have served to strengthen the technical capacity of the malaria staff. Moreover they affirm that without Project assistance, there would be no such international training.

In contrast, Costa Rica is behind schedule in implementing its national training courses. For example, the epidemiology modules courses for professional staff of the health regions and health centers are currently scheduled for March 1988, while the courses for microscopists from health centers and hospitals are scheduled for June 1988.

Regarding courses already held, two courses were conducted in 1987 for community leaders focusing upon community participation in source reduction activities. For the voluntary collaborators, three workshops were held in November 1987, and more are planned in order to complete training of all community collaborators before March 1989.

The Costa Rican part of the sub-regional research project on the ecology and biology of A. albimanus is ready to begin.

National Program Context

In Costa Rica malaria transmission was virtually interrupted early in the 1970s and since then the principal anti-malaria activities have been epidemiological vigilance, aiming at early detection of imported cases, and elimination of sources of infection by applying focal attack measures.

At about the same time (1972), the National Malaria Eradication Service (SNEM) changed in both name and structure. It became the Malaria Service and was integrated into the General Health Services.

As a result of these changes, all malaria field personnel were reassigned to the regional health offices and the health centers. The five zone chiefs of the SNEM became the regional malaria supervisors in the five respective health regions and the 20 sector chiefs became the field supervisors of the 20 health centers in the malarious areas. There are 110 evaluators who make house-to-house visits and at the same time coordinate with the 500 voluntary collaborators in malarious areas, which include a total population of 771,240 (1987). The evaluators are not assigned to health posts, but usually keep in touch with the health post nurse and assistant who also make house-to-house visits, usually on the order of three times a year. The itinerary of the evaluator varies according to the epidemiological conditions of the area, ranging from two weeks to two months to complete a cycle of visits. The nurse and the assistant also take blood slides and give presumptive treatment to fever cases at the clinics and during house visits.

According to the organogram of the Health Services, the function of the regional health unit is administration and coordination, while the health center is responsible for operations. In practice, however, the malaria field operations are directed by the regional malaria supervisor who receives technical instructions from the Malaria Service. It appears that the staff of the regional health office and the health center are not adequately prepared to direct the malaria program other than giving administrative support and coordinating anti-malaria activities with other health programs.

Malaria vigilance activities were effectively maintained for ten consecutive years from 1972. In 1982, Costa Rica registered 110 malaria cases, the lowest number ever recorded since 1959, of which 53 percent (N=58) were imported. However, since 1983 the malaria situation has deteriorated, partly as a result of a large number of legal and extra-legal immigrants from Nicaragua entering along the Atlantic Coast, where ecological conditions are favorable for Anopheles breeding. Malaria incidence has risen sharply, reaching 883 cases in 1987, but the majority (86 percent) of these cases (N=758) were locally infected. The malaria service is currently directing an emergency program, applying residual house spraying and ULV spraying with Malathion and mass drug administration weekly for eight cycles in selected localities. Even these

intensive efforts may not prevent further spread of the disease.

Training

Costa Rica is behind schedule in organizing the national training courses outlined in the Project. The first epidemiology modules course was held in June 1987, but it was intended to train the nine instructors who, in turn, are expected to organize the courses for the professional staff of the health regions and health centers. However, it has been planned to hold five courses of one week duration at the five respective health regions sometime during March and June 1988. Each course will be attended by 20 professionals, including medical officers, nurses, parasitologists, microbiologists and inspectors of environmental sanitation.

Although the malaria program has been integrated into the General Health Services for the last 15 years, the professional staff of the health regions and the health centers have never received adequate technical orientation in malaria control. As the disease is again spreading over the areas where transmission was once interrupted, future control activities will require better skill in technical and administrative arrangements on the part of the health region and the health center. Training of the technical staff at this stage is of utmost importance to strengthen the malaria program and to avoid further deterioration of the epidemiological situation.

The refresher training of the microscopists from the health centers is now scheduled to be given in March or April 1988. For the first three courses, 30 microscopists have been selected and they will be given one week training in the diagnosis of malaria parasites. Before March 1989, another four courses will be held to train 40 microscopists who will be selected from Social Security hospitals. After the training, these microscopists are expected to examine all blood slides taken by the health personnel in the respective areas, thus avoiding unnecessary delay in transporting the slides to the Malaria Service in San Jose. A quick diagnosis and proper treatment of malaria patients will certainly strengthen the malaria vigilance program.

In March 1987, three two-day courses were carried out for 60 community leaders in a suburban section of the Atlantic coast city of Limon, where malaria and filariasis have been important health problems. In November 1987, three more courses were held for 75 community members in another section of the city. After the courses, the communities participated in the source reduction program, having eliminated the major breeding places for anopheline and culicine mosquitoes.

To intensify malaria case detection activities along the border with Nicaragua, three one-day workshops were held for 68 voluntary collaborators living in the area. In view of the migratory movement of the population to other parts of the country, more workshops are planned before March 1989 for the remaining 435 collaborators. In March and April of 1987, two courses were held in Limon and Punto Arenas for training 60 inspectors working in the Aedes program.

It is important to note that Costa Rica has utilized all the international courses offered by the Project. In October 1985, a biologist from the Ministry of Health was sent to the two year medical entomology course in Panama. Unfortunately, he did not complete the course and instead returned to Costa Rica in August 1986. Another biologist from the Malaria Service was sent to the course cycle which started in 1987 and is expected to finish in May 1989. The Malaria Service also sent a professional staff person to participate in the malaria and other vector borne diseases course in Venezuela; this person is expected to finish the course.

In addition, 24 fellowships were awarded to the Malaria Service for its technical staff to attend various short courses of one week to three months duration. These courses were considered to be useful to acquire a broader knowledge in the technical and administrative management of the malaria program. It was reported that the vector control courses devoted too much time to entomology and too little to control measures other than the use of insecticides, with which the participants are already familiar. For future courses, it is crucial to place greater emphasis upon other control measures, such as source reduction and biological control using larvivorous fishes, etc.

Research

The subregional study of the ecology and biology of A. albimanus was approved and the study site selected, and the research awaits only the release of funds.

The Malaria Service also has elaborated a protocol for sero-epidemiological studies to determine the epidemiological repercussion of malaria in those localities subject to migratory movement of the population from neighboring countries. This study will be carried out shortly.

A large-scale source reduction project was undertaken during 1987 with community participation in the vicinity of Puerto Limon. Six month prior construction of drainage canals, extensive studies were made on the breeding habitat of anopheline and culicine mosquitoes. The study will continue after construction has been completed in order to monitor the effects of the program.

B. Country Report

PANAMA: MALARIA

Summary

The Project sponsored national level training has been carried out as planned. In the last three years, 58 professional staff of the health regions and health centers were given a one-week malaria course, using the epidemiology modules. In addition, 267 mid-level health personnel were trained in a three-day malaria control activities course. These training courses are very useful, as the general health personnel show much more interest in malaria control activities after the course.

The National Malaria Erradication Service (SNEM) utilized 20 Project funded fellowships to send its technical staff to participate in international courses of one-week to three months duration on technical issues and administration of malaria programs, medical entomology, health education, etc. No candidate was sent to take advantage of the academic courses given in Venezuela or at the University of Panama.

Regarding research, the SNEM has drafted a protocol for the study of socio-economic factors effecting the rejection of malaria control services by the indigenous Cuna population. This protocol is being presented to PAHO/HQ for approval. The sub-regional research on the ecology and biology of A. albimanus is ready to begin, pending release of research funds from PAHO.

National Program Context

A political decision was announced early in 1987 to integrate the SNEM into the General Health Services. Accordingly, the SNEM which was directly under the Ministry of Health was incorporated into the Direction of the General Health Services, as one of its divisions. However, the SNEM retains its name and vertical structure with is administrative autonomy. There have been no further changes at the operational level.

For the malaria program, the country is divided into nine zones and 40 sectors. The sector is the operational unit with evaluators and spraying squads. The zones and sectors do not coincide with the health regions or with their sub-divisions. There are 297 evaluators in the country who, until 1984, were making house-to-house visits in active case detection activities. However, from 1985 onwards, 169 evaluators operating in a consolidation phase have been stationed at the health centers and hospitals, taking blood slides from fever cases seen at the clinics.

In the attack phase area, 128 evaluators continue their active case finding activities through house visits. There are only 18 voluntary collaborators in Panama and their participation in case finding activities is rather limited. All confirmed malaria cases are given 14 day treatment by the evaluators.

Malaria was well under control in 1978 and for the subsequent eight consecutive years, the number of malaria cases registered was maintained below 350 cases a year or less than 0.2 cases per 1,000 inhabitants. In 1984 and 1985, the number of cases registered was 125 and 126 respectively, the lowest ever recorded since 1959. In 1986, however, the number rose to 1,060 cases and again in 1987 to 1,195 cases. The sudden rise of malaria incidence was due to two epidemics, one in Chiriqui province to the west, bordering Costa Rica, and the other in Darien province to the east, among the indigenous Cuna population, numbering about 2,000 persons.

The Chiriqui outbreak was detected in the fall of 1987, but by the end of the year, it was successfully eliminated with emergency measures including residual house spraying and ULV space spraying with malathion and mass administration of anti-malaria pills in selected localities. On the Costa Rican side of the border, malaria transmission still exists and, with a constant movement of the population along the frontier region, it is feared that similar outbreaks may take place in the future. To coordinate anti-malaria activities and to strengthen the vigilance program between the two countries, a border meeting of the Directors of the two respective Malaria Services is to be held shortly.

In the Darien area, malaria transmission has continued since 1986 and is still persistent to date. The Cuna, because of religion, culture and custom, do not permit the SNEM to apply the necessary anti-malaria measures or to give a full course of curative treatment. To study the problem and find a solution, an anthropologist was contracted and a research protocol titled

"Estudios Socio-Economicos de Factores Relativos a Malaria" was written. (See Research section.) In other parts of Panama, malaria cases also increased in the last two years, but so far they seem to be limited to cases originating in the two principal foci of infection, i.e., Chiriqui and Darien.

Training

National training courses have been carried out as planned. During 1985 and 1987, three one-week courses were held for 58 professional staff of the health regions and health centers, using the epidemiology modules. The participants included medical officers, nurses, inspectors of environmental sanitation and health educators. Two more courses will be held in 1988 to complete the training of all professionals at this level.

During January and March 1986, ten three-day workshops were held for 267 mid-level health personnel, including auxiliary nurses and health assistants of the health posts and some voluntary collaborators. For these workshops, a print-out on "Elementary Concepts of Malaria" was prepared and distributed. These national training courses are very useful for the future of malaria control and have an immediate impact in that general health personnel show much more interest in malaria control activities after the training. For example, when a malaria outbreak took place in Chiriqui province, the regional medical officer and his staff collaborated fully in the elimination of the transmission foci, cooperation that had not occured previously.

Panama has only 18 voluntary collaborators and their participation in the malaria program has been very limited. No special courses were given to this group, but some of them were included in the courses for mid-level personnel.

The SNEM has 25 microscopists of whom nine have been posted to zone field offices and the rest to Panama City. All blood slides are examined either at the zone offices or at the SNEM central laboratory. There are other microscopists in the health centers and hospitals and they will be given refresher training in 1988.

The University of Panama initiated a two-year course on medical entomology leading to a masters degree. The first course held during

1983-85 enrolled eight students, but only three completed the course.

Currently two of the graduates are working with the University and one with the Panama Canal Commission. Since 1985, the Project has awarded fellowships to those students from the sub-region and it has provided related equipment and supplies. In addition, the four PAHO entomologists in Panama have been involved in lecturing and laboratory work. The two -year medical entomology course has reputation of being academically rigorous. In the 1985-87 course, seven students registered, but only four completed the course. Of the four graduates, three were from the sub-region: one was from the Honduras Malaria Service; another from Guatemala's Universidad del Valle, and another from Panama's University. It seems with support from the Project, the University is now fully capable of providing training for professional entomologists in medical, agricultural and general areas for the entire Americas region, if the students are provided with fellowships. We therefore recommend that PAHO plan its disengagement from teaching responsibilities.

The Project also sponsors a short international course on medical entomology for mid-level entomologists from the various national malaria services. The course is of eight weeks duration, six weeks in Panama for classroom and a laboratory work and two weeks in Guatemala for field practice. The first course was held in 1986 and the second course is currently in progress. The PAHO entomology staff are working as instructores for this course. Over the last three years, the SNEM also sent 20 of its technical staff to participate in other international short courses held in the USA, Guatemala, Honduras and Costa Rica. However, the SNEM did not send any professional to the malariology course in Venezuela or to the masters course in medical entomology at the University of Panama.

Research

As mentioned previously, a research protocol titled "Estudios Socio-economicos de Factores Relativos a Malaria" was prepared to study why the Cuna population refuses to accept anti-malaria measures. For this research, a sociologist and four students from the University of Panama will be contracted. They will work together with the leaders and other Cuna community members, as well as with the malaria evaluators assigned to the area. They will combine research and health education

activities, and when and where possible, they will introduce anti-malaria measures to eliminate the source of malaria infection. The protocol is being presented ot PAHO/HQ for approval.

The sub-regional research project titled "Studies on Ecology and Biology of A. albimanus," for which a protocol was approved and a study site selected, is ready to start, pending availability of research funds.