directing council

PAN AMERICAN HEALTH ORGANIZATION

XXXI Meeting

regional committee

WORLD HEALTH ORGANIZATION

XXXVII Meeting

Washington, D.C.
September - October 1985

CD31/INF/2 (Eng.)
20 September 1985
ORIGINAL: SPANISH
(Machine Translation)

STATUS OF MALARIA PROGRAMS IN THE AMERICAS

XXXIII REPORT

(PROVISIONAL)

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INTRODUCTION

In 1984 the Malaria Programs in the Americas continued to its general purpose of preventing and controlling the disease and reducing its endemicity in the more severely affected areas, while treating epidemic foci and interrupting transmission in areas of low endemicity. The present socioeconomic crisis in the Latin American countries precludes any effort commensurate with the high impides that both the Governments and the Organization attach to combating this disease.

Few countries made any progress toward their specific objectives, and on the whole, the malaria situation either remained stationary or worsened relative to the previous year.

During 1984 the countries continued efforts begun in earlier years to strengthen their systems of epidemiological surveillance and to find arrangements for greater intrasectoral participation. The malaria program continued to operate in the area of vector control using household residual insecticides, antilarval measures, chemicals, larvivorous fish and reduction of breeding places, personal protection (use of repellents and mosquito nets), and case treatment.

The purposes in the treatment of confirmed cases was primarily the avoidance of death due to malaria, the reduction of morbidity, and a mitigation of the suffering of victims. Epidemiological and operational stratification of malarious areas was begun in most of the countries with a view to the adjustment of strategies to local situations and available resources.

Manpower training was stepped up in 1984 along with basic and operations research for the development of new control technologies and better and more effective diagnostic, evaluation and epidemiological surveillance systems.

Efforts continued to improve information systems. In this field, several countries began the use of computerized tabulation and analysis of field data. However, a lack of unified standards and large number of existing systems impeded progress in this particular area.

Insecticides remained the chief means for the control of transmission. The use of DDT in 1984 was kept at the same proportion as in 1983 which was low in comparison with the coverages previously attained with this product. Alternative organophosphorus and carbamate insecticides continued in use in several countries, although their high cost and the difficulty of obtaining them abroad confined their use to limited areas carefully selected for their epidemiological conditions and the resistance of vectors in them to DDT.

Antimalarial drugs were used on a large scale, both for prevention and for radical cure of the disease. The problem of resistance in P. falciparum to chloroquine grew worse in several South American countries, which were obliged to revise their treatment schemes and to adopt drug combinations more effective against the resistant plasmodium strain.

In the area of the promotion of mechanisms for interagency coordination and financing, headway was made in the Central American subregion toward the identification of priority health areas and the design of projects in them. One of these areas was tropical diseases, in which malaria is one of the leading problems. Efforts were made to identify sources of domestic and foreign financing and technical cooperation and training needs.

In the Andean area, too, progress toward funding was made with the implementation of bilateral agreements in effect between several countries in the Region and international financing agencies and governments of industrialized countries.

I. CURRENT STATUS OF MALARIA CONTROL PROGRAMS

A. General Information

Although the countries in the Region have adopted malaria control strategies, the criteria for the implementation of effective control, more complex than those for eradication, have not yet been properly worked out. Because of this, the epidemiological situation continues to worsen in the Region, the 830,700 cases of 1983 having risen to 914,171 in 1984 (with as yet incomplete information from three countries). This increase of 83,471 cases in 1984 comes to 10%, higher than the increases of previous years (Table 1).

The countries of the Region have been grouped in four groups in accordance with the magnitude of the malaria problem, the degree of implementation of the program and the quality of its results.

Group I. Includes the 12 countries in which there is no evidence of transmission (Map 1)

Group II. Contains four countries in which malaria transmission has been considerably reduced and the favorable situation has continued (Map 2).

Group III. Covers four countries in which malaria has increased in endemic areas (Map 3), and which accounted for 42.23% of all cases in the Region in 1984.

Group IV. Comprises 13 countries in three subregions: the Caribbean, Middle America, and the Andes. This group reported 516,695 cases of malaria in 1984, or 56.52% of the total number in the Americas.

Table 2 shows that, of the 1,206 cases diagnosed in the 12 countries and territories (Group 1) that had achieved eradication in earlier years, most were in the United States (792) and Cuba (401). Most of these -- 791 in the United States, 394 in Cuba, two in Puerto Rico, five in Jamaica and six in Trinidad and Tobago -- were classified as imported.

In the 21 remaining countries having active control programs, the number of cases increased. In four countries the numbers decreased slightly and in two -- Colombia and Honduras -- by 47% and 27%, respectively. The other 15 countries posted increases, notably Brazil, where the number of cases increased 80,000 from 1983, and Ecuador, where the number rose from 51,606 in 1983 to 78,599 in 1984. The situation by groups of countries and geographic subregions may be summarized as follows:

Among the Caribbean Islands, the only one on which transmission is active is Hispaniola, with its two countries: the Dominican Republic and Haiti. The situation in Haiti worsened and that in the Dominican Republic improved slighly, with 1,431 fewer cases in 1984 than in the preceding year. All the autochthonous cases detected on Hispaniola are of the species P. falciparum.

In Mexico the situation worsened in 1984 (with 10,474 cases more than in the preceding year), and in Central America and Panama, only the later country and Honduras showed any appreciable improvement. Panama was the only country that was able to sustain the downtrend of incidence, and most of the 125 cases discovered during the year were imported from neighboring countries. In Honduras the number of cases dropped 27% from 1983 to 1984, as previously noted. In Belize the situation remained unchanged, and in the other countries it deteriorated, including Nicaragua where, after a downtrend carried from the earlier years, the number of cases increased 2,795 cases from the 1983 level. In Costa Rica the number of cases in 1984 was 132% higher than in the preceding year, although the absolute figure remained low (569 cases).

In South America the malaria situation may be viewed in the continent's four major subregions: the Andean region, Brazil, the Guianas (Guyana, Suriname and French Guiana), and the two malarious countries of the Plata River Basin (Argentina and Paraguay)

In the Andean subregion, the epidemiological situation evolved, on the whole, favorably in 1984. However, of the constituent countries -- Bolivia, Colombia, Ecuador, Peru and Venezuela -- only in Colombia did the number of cases decline. In Bolivia, Ecuador, Peru and Venezuela (although the information on the two last-named countries is incomplete) the number of cases rose in 1984, and quite appreciably in Ecuador.

In Group III, in the Brazilian subregion, the number of cases rose 17% from 297,687 in 1983 to 378,257 in 1984. In the Guianas, the situation remained stationary in 1984 only in French Guiana. In the other two countries of this subregion, malaria transmission was on the increase. The increase was 43.5% in Guyana and 98% in Suriname, although the absolute number of cases was low in both countries.

In the Plata River Basin the number of cases dropped slightly in Argentina, from 535 in 1983 to 437 in 1984. In Paraguay, on the other hand, the number of cases soared alarmingly from 49 detected in 1983 to 554 in the following year.

The classification of malaria control programs in terms of phases follows the terminology of malaria eradication, and the countries have continued to use that grouping, as shown in Tables 3, 4 and 5, for purposes of comparison with the information of earlier years.

It can be seen that there were no major changes in the population of the malarious areas in the different phases of the program. The numbers reflect only natural population increase. The figures and proportions of the populations in the different phase areas are as follows:

maintenance phase:	124,408	- 48.4%
consolidation phase:	68,420	- 26.6%
attack phase:	64,448	- 25.0%
total population in malarious areas:	257,276	- 100.0%

The general results of case-finding (Table 6) indicate that 9,422,827 blood samples were examined, most of them (65.6%) taken from areas in the attack phase. In maintenance areas more samples were taken in 1984 (1,302,266) than in the previous year. The slide positivity data did not change from one year to the next (0.93%). In areas in the consolidation phase, 1,845,899 blood samples were taken (156,848 fewer than in 1983, although the information remains to be completed for three countries). The positive samples from these areas increased in 1984 from the preceding year (50,385 and 47,353, respectively). This information confirms the deterioration taking place in the programs, for it betokens a resumption of transmission -- the increase was most substantial in Brazil, Ecuador and Mexico. Positivity in 1984 also increased in attack areas (842,618 cases compared with 764,961 in 1983), which indicates that the control measures taken in this area were insufficient or ineffective to control the endemic.

Table 7 presents the epidemiological information on the 21 countries having active control programs. This group of countries accounts for 99.5% of the positive samples found in the Hemisphere. Brazil and Ecuador, with a total of 456,856 cases between them, supplied more than half of the cases in the Region. In Brazil transmission by P. falciparum rose from 48.3% in 1983 to 54.6% in 1984. In Colombia, on the other hand, this indicator dropped to 35.1% in 1984 from 45.2% in the preceding year.

According to the indexes of Table 7, the incidence of malaria during 1984 remained highest in Belize and Guatemala (25.7‰ and 23.9‰, respectively), and was lowest in Panama, with an API of 0.06‰.

Following are the figures on sprayings with DDT over the last 11 years. The number of sprayings rose slightly in 1984 from the level of 1983.

Year	DDT Sprayings
1974	14,270,027
1975	13,532,982
1976	11,347,781
1977	9,751,636
1978	9,098,629
1979	9,401,860
1980	9,166,577
1981	7,525,467
1982	4,541,133
1983	3,629,088
1984	3,725,155

Antimalarial drugs for presumptive case treatment were used in all countries with programs. Table 16 provides data on the use of drugs during 1984 and an estimate of this expected consumption in 1985. Table 17 specifies the total quantities of drugs used from 1981 to 1984.

Table 18 contains information on the personnel employed in antimalaria programs in 1983 and 1984.

C. Budget

Table 19 summarizes the data on the funding of malaria programs in the Americas. It distinguishes between financing from governments, that contributed by PAHO/WHO, and loans and grants from other international sources. The figures are stated in absolute values for each year and are conversions to Unites States dollars at the established official exchange rates in the different countries. In several countries the black-market value of the dollar is far higher than the established official rates.

D. Country Information

ARGENTINA

Specific activities under the Program proceeded during the year at very low proportions of what had been planned, to the detriment of effectiveness and efficiency, chiefly owing to economic and financial causes.

Tables 8, 9, 10 and 11 show the blood samples examined and the positives by species and phases of the programs in accordance with the origin of the cases. Table 12 compares the active and passive case-detection in each country. According to these figures, 49.8% of the samples were examined by passive case-detection, by which the largest number of cases (74.2%) was detected.

B. Field Operations

The use of insecticides, the chief vector control measure, held in 1984 at the level of 1983. Table 13 presents the data on the products used in malaria programs. The figures on DDT remained practically unchanged; the use of propoxur rose slightly and that of fenitrothion declined. DDT remained the leading insecticide in use, though not used at all in El Salvador, Guatemala and Haiti.

It might be expected that decreasing reliance on insecticides as the chief attack measure would be reflected in a diversification of control measures. Unfortunately, there has been no significant trend in this direction. In almost all areas where spraying has been discontinued, other control methods have not been implemented, apart from distributions of drugs in selected areas.

Table 14 shows an increase in the use of propoxur and a decline in that of fenitrothion and other insecticides in 1984. Table 15 shows a reduction in the number of sprayings with different insecticides over the period from 1981 to 1984.

Eight countries used larvicides as a malaria control measure for the protection of 2,242,000 inhabitants. In Haiti, protection with larvivorous fish covered the same area as in the previous year, with 42,614 inhabitants. Small sanitary engineering works for the reduction of breeding places were used in El Salvador, and protected 392,000 persons.

Another measure employed was mass drug distributions, which were carried out in five countries for the protection of 1,273,540 persons. Selective treatment was used for 651,257 persons in four countries.

Part of the population exposed to the risk in malarious areas remained unprotected by any control measure whatever. Eight countries reported having left total of 12,746,387 persons without care for lack of funds, and it is estimated that 680,000 persons are unprotected owing to social problems that disturb the public order, and to the difficulty of access to some areas.

Only 47.8% of the programmed household visits were carried out, and this proportion was even lower in the area in the attack phase (38.3%). The indexes were: API -- 2.8%o; SPI -- 3.0%; ABER -- 9.3%, including total active and passive surveillance activities.

Only 50.8% of the intradomiciliary spraying scheduled in the area in the attack phase (Salta province) was carried out. In addition, there were 41 occasional support sprayings for the control of a transmission pocket in the maintenance-phase area (Jujuy province).

In regard to the general epidemiological situation, the reported 437 cases were 81.6% of those reported in 1983, and 34.7% of them were imported; 27.4% of those cases were in the high-risk maintenance-phase area (Jujuy province), with 10.8% of them imported.

BELIZE

Efforts have been made in the country to bolster the program's operating capacity. The immediate targets set for 1984 were a) to improve the reporting system and field supervision, b) to step up passive case-finding work, administer supervised radical cure treatments, and monitor treated cases. The targets for these activities over the year were fulfilled to the extent of 70%. Only 20 of the 224 localities in which positive tests were obtained accounted for 41.8% of all cases.

BOLIVIA

During 1984 the absolute number of cases of malaria increased and the disease became more widespread. This deterioration of the country's epidemiological situation resulted from a substantial reduction in the quantity and quality of control measures.

The leading vector-control measure remained indoor house spraying with DDT, which was carried on with many interruptions owing to stoppages and strikes of the field personnel, which opened wide gaps in the geographical coverage (unsprayed localities) and disruptions of the schedule (sprayings carried out at inappropriate times).

Funding for the budget both from the National Treasury and from external financing sources came very late (late July) and was not enough, and the situation was aggravated by the drastic loss of purchasing power of the currency owing to the hyperinflation raging in the country. Utilization of the budget was restricted by sharp changes in the prices of inputs and their frequent unavailability on the local market. Work was done on a mere 42% of the working days. Owing to the severe prevailing economic constraints, the supervision needed for the rectification of shortcomings at each level was practically not exercised at all.

BRAZIL

Despite SUCAM's efforts, results in the long-term eradication area (Amazonia) were not satisfactory.

One of the measures taken in the northern and west-central areas of the country was a stratification based on epidemiological, ecological and socioeconomic factors. The spraying schedules in settlement projects were changed and health information and education was stepped up. The quality and numbers of the human resources were to be improved.

In 1984 there were 378,257 cases, 27% more than in the previous year. Para and Rondonia accounted for 76% of the cases in Amazonia and for 73.5% of the national total.

Results in the non-Amazonian region, that is, the short-term eradication area, remained favorable, although migration increased the number of malaria cases in the states of Piaui in the northeast and Paraní and Sao Paulo in the south.

The residual foci in Mato Grosso do Sul, Goias, Parana and Santa Catarina, despite a reduction in their numbers of cases, remained active.

COLOMBIA

In 1984 the situation of malaria improved in terms of total reported cases (55,268 in 1984 compared with 105,360 in 1983) and of indirect indicators, which suggest a decisive influence of weather, focalized control operations and a number of social variables.

The coverage of spraying came to 38.2%. The region reporting the largest number of cases was the pacific littoral, where P. falciparum was amply predominant.

A lack of administrative and budgetary flexibility limited the normal conduct of activities and contributed to successive stoppages that brought all operations to a standstill for an estimated four months.

The prospect for 1985 is even dimmer because the budget allocated is sufficient to cover only 50% of what was requested for operation of the program.

COSTA RICA

In 1984 a total of 103,987 blood samples were examined or 14.5% of the established target figure, and a slide positivity index of 0.55% was obtained. The positive cases numbered 569 for an annual incidence of 0.79 per 1,000 inhabitants. In 1983 there had been only 245 cases.

At the end of the year, 29 of the 36 cantons in the malarious area, covering 27,832 km^2 (79%), were in the consolidation phase. The population in the area of interrupted transmission was 617,733 inhabitants, or 86% of the total number at risk.

The most important outbreaks took place in the border cantons of Alajuela and Limon provinces, with 200 and 298 cases, respectively, and in Sarapiqui canton, Heredia province, with 96 cases.

The cases were spread very thinly in 120 localities, and those had to be selected which were most closely connected with migrations. Among the measures taken, priority was given to collective treatment, and doses were administered every 15 days to about 6,300 persons in the more vulnerable cantons of San Carlos and Los Chiles.

Treatments were also carried out in the Tilaran and Limon refugee camps, where about 2,329 refugees were seen, and 43 of them found to have malaria, or 8% of the total cases for the year.

The following cases were classified as imported: 267 from Nicaragua, three from El Salvador, three from Guatemala, three from Honduras, and two from other countries, which added up to 49% of the total.

In 1984 the malaria program was adequately financed by the Government, and it was given appropriate priority in the National Health Plan. Special funds had to be drawn on to deal with the emergencies in the north.

ECUADOR

The incidence of malaria continued to rise in 1984. The total number of cases increased 52%, while infections with P. falciparum held at the same level of the previous year. The disease spread more widely over the country as attested by the number of localities in which positive tests were made (3,356 in the attack area and 657 in the consolidation area), for increases of 52% and 141%, respectively, over the 1983 levels. The new positive localities numbered 1,550, and this spread of the disease was widest into the consolidation area. Esmeraldas province, with only 6% of the population in the malarious area, accounted for 28% of all cases, and the provinces of Manabi, Guayas, Los Rios and Napo for 18%, 16%, 16% and 12%, respectively. These five provinces together accounted for 90% of all malaria cases in the country. Esmeraldas province harbored 65% of all P. falciparum infections, followed by Manabi with 17% and Guayas with 9%, for a total of 91% of these infections in the three aforementioned provinces. Malaria continues to turn up in urban areas, and Guayaquil, with a million and a half inhabitants, is one of the cities at highest risk. The SNEM Central Laboratory detected 2,814 cases, of which 1,273 were classified as autochthonous.

During the first half of the year, indoor household sprayings were insufficient for lack of insecticides and vehicles. The program received DDT for the operations of the second half of the year, but applications were hindered by insufficient vehicles and stoppages by personnel claiming payment of their wages on time. Spraying with fenitrothion was impeded by the same circumstances, and the quarterly spraying schedules could not be held to exactly in the area of the greatest transmission.

EL SALVADOR

The Salvadorean administration that took office in June 1984 continued to recognize malaria as a serious obstacle to the country's socioeconomic development. The high morbidity from this disease ranked malaria fourth among communicable diseases in the country. The sociopolitical conflict that has been going on since 1979 limited fulfillment of the targets and objectives of the malaria program, and activities continued to be limited. The national budget assigned to the program had remained unchanged over the last four years in consequence of the acute economic crisis that plagued the country and limited control activities.

With a view to more efficient use of the scarce resources available to the program, three degrees of priority were defined based on endemicity. Highest priority was attached to an area of 4,819 km^2 with 822,000 inhabitants in which 85% of all cases had been detected. However, the available resources afforded the coverage of only 32% of that population, which is 6.4% of the total population in the malarious area.

In 1984 UNDP funds were obtained for the performance of feasibility studies toward the adoption of antimalaria engineering works in one of four coastal swamps that pose a serious obstacle to attainment of the goal of the program. In addition, application was made to the Salvadoran Fund for Preinvestment Studies in the Ministry of Planning for funding for the three remaining studies.

The most serious direct technical obstacle to advancement of the program is the physiological resistance of Anopheles albimanus to almost all available insecticides in much of the country, chiefly in the areas of greatest transmission. Other technical factors to be considered are a) the periodic migration of workers for the planting and harvesting of crops and those prompted by the state of social conflict in the country, and b) the precarious state of housing units and the types of materials of which they are built, which also prevent the insecticides applied from having a more lasting effect even in the area where the vector is susceptible.

Notable administrative limiters of progress are a) permanent reductions in force both in offices and in the field; b) the aforementioned shortage of funds; c) a lack of administrative flexibility for obtaining and distributing inputs, and d) the inadequacy and poor condition of the operational equipment and vehicles.

FRENCH GUIANA

In the Remiere area the malaria situation improved. Although in the city of Cayenne no transmission was demonstrated, there are extensive breeding places of A. darlingi in the suburbs and in swampy areas. These places are being drained to reduce the areas where these anophelines can breed. During the summer an epidemic broke out on the French bank of the Maroni river on the border with Suriname.

GUATEMALA

The factors that had impeded progress and even gave rise to a severe worsening of the epidemic situation in recent years are diverse. There are technical factors such as anopheline resistance to many insecticides; operational factors such as the armed hostilities in progress in some areas, which have led to the partial suspension of some activities; and, finally, administrative factors, such as a scarcity of funds, the laborious paperwork required for the acquisition of inputs, an insufficiency of vehicles, and desertion of personnel owing to the paucity of the remuneration.

In 1984 funds were budgeted to cover basic requirements such as purchases of insecticides, but the restrictions imposed by the purchasing formalities blocked the availability of this input.

Only in the southern ecological zone (the Pacific coast) could indoor house sprayings with deltamethrin be maintained in 1984, with the result that the number of cases dropped 8.8% from 21,695 cases in the previous year to 19,777 cases.

The northern and central ecological zones suffered from a lack of insecticides, no fenitrothion or deltamethrin being available for use in them until the last two months of the year.

In the northern zone the number of cases rose from 30,400 in 1983 to 41,188 in 1984 (an increase of 35.5%), and in the east central zone from 11,888 to 13,158, for a 10.7% increase.

These measures were complemented by continued treatment of malarial patients and the use of collective chemotheraphy in localities of high positivity, which kept the situation from being even worse than it was.

GUYANA

There was little geographic change in the malaria situation from 1983 and no evidence of transmission on the coast. However, epidemiological research pointed to the existence of probable new foci downstream from the confluence of the Essequibo and Mazaruni rivers.

In the interior the epidemiological situation deteriorated from 1983 with an increase of about 50% in the number of cases. Major changes are planned in the program, including a) increased articulation between the Malaria Service and the Regional Health Groups; b) the use of DDT spraying only in the Rupununi region; c) a strengthening of passive as against active case-finding, and d) a dismantling of the surveillance system at the airport, which has proved as expensive as ineffective.

HAITI

During 1984 far-reaching changes were made in the structure of the program, and it was given the following objectives: The reduction or elimination of severe cases; a reduction of incidence; a study of the effects of insecticides, and a strengthening of collaboration by the National Major Epidemics Service with the services of the Ministry of Health.

The chief priorities set under the new program orientation were as follows:

- To organize a permanent drug distribution net work and increase the number of volunteer workers.

- To seek the participation of the Ministry of Health in the different aspects of programming: planning, execution and development.

- To step up socioeconomic and operations research work.

HONDURAS

Malaria control operations were conducted regularly until July, when indoor house spraying was brought to a standstill by a lack of insecticides and of funds for purchasing them. In addition, the stocks of drugs were exhausted in October, and an emergency loan had to be taken so that the epidemic outbreaks that had occurred could be checked.

Although the epidemiological situation of malaria in 1984 showed progress both in a reduction of the total number of cases and of P. falciparum, and the search for cases was greater in terms of numbers of slides examined and of localities with information, the malaria program lacked the principal inputs (drugs, insecticides, and equipment), which reduced the scale of regular control operations and confined them to secondary measures and others for larval control in cleaning operations. Unfortunately, this situation will apparently extend into the early months of 1985, which indicates that the program will deteriorate and the progress and gains made in recent years will be slowed down.

The situation in the city of Choluteca was kept under control, despite an upswing in the number of cases in November and December. Of the 389 cases reported during the year, 243 were discovered in the last two months of the year.

There were 14,215 cases (52%) clustered in 296 localities, which points to a degree of focalization of malaria that could open the door to better rationalization of the use of resources in 1985.

In 1984 the number of institutional and community personnel increased very greatly.

MEXICO

The malaria program in Mexico continued receiving priority attention from the authorities, although this time that attention was decentralized through the Coordinated Health Services. The further deterioration of the malaria situation in 1984 is blamed on financial problems and a shortage of personnel.

The country launched an active plan for manpower development within the Coordinated Services of the states most severely affected by the endemic, and continued its operations research with the cooperation of UNAM (the Autonomous National University of Mexico), the Medical Center and the Malaria Research Center at Tapachula, Chiapas state. Diverse research projects were set in motion, incluing studies of the effects against malaria of some plants traditionally used against the disease; serologic studies (the immunology of malaria); studies of pathogens that prey on vectors in nature; larval control by biological and physical means; a study of the habits of the vector, etc. The immediate purpose of all these research projects is to find solutions to the growing epdemiological problem of malaria in the country.

NICARAGUA

The malaria situation deteriorated in 1984, with 2,795 more cases reported than in 1983; this increase was most apparent in Region II where, according to the epidemiological data, all cases detected were clustered in Chinandega department. The main reasons for this deterioration were failure to complete the scheduled indoor house spraying programs of the last two years and insufficient equipment and insecticides used in the vector control operations.

At present the authorities are considering new approaches for achieving real control of malaria, which include administrative decentralization and "stratification" of the problem with a view to improved use of the available resources. A specialized group at the central level will continue to oversee operations in order to ensure that the health regions comply with the program prerequisites, which include:

- The allocation of an adequate budget;
- The design of a career structure for the personnel;
- Auditing of their financial condition;
- The establishment of epidemiological analysis units;
- Determination of decision-making, coordinating and supervisory levels;
- A redistribution of resources in accordance with the stratification of the problem.

PANAMA

During 1984 the National Malaria Eradication Program continued keeping the epidemiological indicators low, with a significant reduction in the number of cases reported and a high percentage (76%) of imported cases.

Of the 9,706 localities into which the country is divided, malaria was present in only 37. Seventy-five percent of these localities are along the border with Colombia, the place of origin for most of the cases discovered in the country.

The Program maintained regular basic indoor house spraying operations with residual insecticides (DDT, OMS-33 and sumition) in areas still in the attack phase, although without achieving total coverage owing to difficulties in obtaining DDT on time on the international market and to economic difficulties to which the country had contributed.

In 1984 a Pilot Plan was drawn up for four areas in the provinces of Chiriqué, Veraguas, Herrera, Los Santos and Coclé; the coverage scheme was one designed by the Ministry of Health through its care facilities (hospitals and health centers) in each of which a SNEM evaluator was stationed to pick up all febrile patients presenting for medical consultation, which eliminated active case-finding in the areas of influence of those medical care establishments. The plan is under ongoing evaluation at present and yielding highly gratifying results not only because the personnel of the Malaria Services are being integrated into the General Health Services, but also because the plan is making the most of the strategic situation of the structures of the country's health system.

PARAGUAY

The antimalaria program deteriorated considerably during the year.

Of the 544 cases detected, 19 were of P. falciparum and 507 were classified as indigenous in 112 localities, 104 of them in areas in the attack phase. All the P. falciparum cases had been imported from Brazil.

No case has yet been seen of resistance to the customary chloroprimaquine treatment, nor has any problem emerged with the use of DDT, to which the chief vector, A. darlingi, is susceptible.

Operational difficulties arose during the year owing to the poor state of the spraying equipment and vehicles and the very sharp rise in the prices of materials (DDT, drugs, fuels, equipment and uniforms).

The Epidemiology Department drew up a plan of operations for the elimination of active residual foci in Indian communities, but difficulties were encountered in obtaining enough drugs on time, so that the scheduled general radical treatment could not be carried out.

The dispersion of cases from the epidemic foci that emerged during the year necessitated a widening of DDT coverage to areas where spraying had been suspended.

PERU

The epidemiological situation continued to worsen in 1984. The areas with the most serious transmission problems were in the municipalities of Bajo Mara]çn in Loreto department; Bagua in Amazonas, Jaen in Cajamarca, La Leche in Lambayeque, and San Lorenzo, Chipilico and Bigote in Piura department. Foci of active transmission also emerged in Junén and Cuzco departments in the central region.

Some of the leading causes of this worsening of the situation were migration in search of employment, the construction of temporary shelters, insufficient insecticide coverage, makeshift housing units, difficulty of access, and the reluctance of communities to accept antimalarial treatment.

While antimalarial activities in Peru remained the responsibility of the General Health Services, there was still need of technical training at all levels, and particularly among the personnel of those services who conducted the epidemiological surveillance of malaria at the regional level.

DOMINICAN REPUBLIC

During 1984 the malaria situation improved remarkably throughout the country. Of a total of 413,416 blood samples examined, 2,370 proved positive, for a slide positivity index (SLI) of 0.57% and an annual parasite index (API) of 0.39 per 1,000 inhabitants.

In 1984, 91,827 blood samples more were examined than in 1983, in spite of which 1,431 fewer cases were diagnosed; the SLI and API declined to 48% and 38%, respectively.

Indoor house spraying continued in localities of greatest receptivity and vulnerability for the purpose of interrupting transmission there. DDT spraying was done in 697 localities aggregating 78,197 housing units and 325,077 inhabitants.

The canals and lagoons in the border region with Haiti, always potential breeding grounds for anophelines, continued to be regularly and continually cleaned. The stocking of guppy fish continued with lesser intensity in anopheline breeding places in the suburbs of the National District; this activity has not yet been evaluated.

In addition to budgetary limitations, the main problem is a social one, connected with the migrations generated both inside the country and from neighboring Haiti. Migration is increasing steadily, and is causing the emergence of epidemic outbreaks in areas whose bioecological conditions and the manner in which production is organized in them are making increasingly attractive to migrants.

SURINAME

The malaria situation has improved considerably in some parts of the country. In the Stoelmans Island area and the region bordering on French Guiana there was a severe malaria outbreak from July to September. There was a great need to improve data records and epidemiological evaluation. It was felt that an extensive seroepidemiological study could be highly useful.

VENEZUELA

Between January and September 1984 the malaria eradication program deteriorated owing to budgetary shortfalls, particularly to cover the travel expenses of supervisors, rural home visitors, crew chiefs, and sprayers.

In the first quarter of the year transmission was intense in northern Barinas state and southern Portuguesa state, which were in the maintenance phase, but entered into decline in the second quarter with implementation of the antimalarial measures.

In Colçn municipality, Monagas state, which is in the maintenance phase and in the area of partially refractory malaria, an outbreak of P. vivax was detected in August owing the presence of Anopheles emilianus and active movements of people to and from Sucre state. There were epidemiological problems in the area during the fourth quarter of the year.

In the maintenance-phase area of Bolivar state, malaria transmission continued in the new mining areas, 80% of the cases being of P. falciparum, which gave rise to new active foci there and in neighboring states.

In the western malarial area in the attack phase, the annual parasite incidence (API) was 0.4 per 1,000 inhabitants during the period, with an annual blood examination rate (ABER) of 12.3; in the southern malarious area the API dropped 2.0 with an ABER of 23.4.

Funding of 32 million (thirty-two million) bolivars was received in July and used to cover some of the budgetary shortfalls in the variable costs

for personnel and operations and 55% for the acquisition of drugs, insecticides and insecticide-applying equipment, microscopy equipment, and equipment for transportation (by land and river), all for delivery in the course of 1985. This additional credit complements the total budget for 1984, which came to Bs. 96,065,814.

II. PROBLEMS IMPEDING THE PROGRESS OF THE PROGRAM

The old problem of vector resistance to insecticides in Central America and Haiti (maps 5 and 6) has created serious operational and financial difficulties for those countries because more effective insecticides are expensive.

The highest resistance is encountered in the Central American Isthmus from southern Mexico to Panama and in Haiti. A. albimanus, the leading vector of malaria in those countries, has grown resistant to chlorinated insecticides, to many organophosphates (OP) and some carbamates. It is known that an important factor in the emergence of this phenomena is the presence of cotton and rice plantations, subjected as they are to massive airborne pesticide applications for several months, that also are the months of heaviest anopheline density. It is this enormous pressure that has resulted in selection of the multiresistant strain that is so difficult to control today. The affected countries are now compelled to seek the solution of the problem in other insecticides. These, effective at first, soon cease to be so. It is also known that when a country decides to use a new product in public health campaigns, it often turns out that the product has already been in agricultural use for years before.

In Central America many insecticides alternative to DDT have already been used with good results, such as propoxur, which was applied on a large scale in the early seventies. Unfortunately, the cost of this carbamate has placed it almost beyond the reach of the countries in the Region. The same may be said of chlorfoxim, resmethrin, and fenitrothion. The latter now appears the most promising compound, and is the one in greatest use in Guatemala, Honduras and Haiti.

Unfortunately, some countries have launched plans for spraying with new insecticides donated by governments of producing countries. When the supply donated has been exhausted, since no provision has been made for continued purchases, the spraying plan has come to a standstill and the epidemiological situation has worsened all over again. This is a frequent phenomenon, and, until a lasting solution is finally found, it will remain a cause of ups and downs in the indices of malaria transmission.

The following table gives the numbers of sprayings made with the three insecticides most heavily used under programs in the last five years. Note the steady decline in the use of DDT and the concurrent increase in the use of the other two.

ESTIMATE OF COSTS OF SPRAYINGS WITH THREE INSECTICIDES
IN 21 LATIN AMERICAN COUNTRIES

	1980	1981	1982	1983	1984
1) DDT 75%					
Number of sprayings	9,166,577	7,525,457	4,541,133	3,629,088	3,725,155
Equivalent in kgs[a)]	4,885,785	4,011,068	2,420,424	1,934,304	1,985,508
Value in US$ (1kg=1.40)	$ 6,480,100	$ 5,615,496	$ 3,388,593	$ 2,708,025	$ 2,779,710
2) Fenitrothion (40%)					
Number of sprayings	80,244	388,223	810,753	1,027,150	524,279
Equivalent in Kgs[b)]	80,244	388,223	810,753	1,027,150	524,279
Value (1kg=4.50)	$ 360,675	$ 1,747,003	$ 3,648,388	$ 4,622,175	$ 2,359,256
3. Propoxur 50%					
Number of sprayings	68,218	62,605	85,848	13,942	78,972
Equivalent in kgs[c)]	54,574	50,084	68,678	11,153	63,178
Value (1kg =10.50)	$ 573,027	$ 525,882	$ 721,132	$ 117,113	$ 663,365
Cost of three insecticides[d)] in US$	$ 7,773,802	$ 7,888,381	$ 7,758,113	$ 7,447,313	$ 5,802,330

a) One spraying with DDT 75% = 533 g of wettable powder
b) One spraying of fenitrothion 40% = 1,000 g of wettable powder
c) One spraying with propoxur 50% = 800 g of wettable powder.
d) Average cost based in 1984 prices.

Although their operations have not been impaired by the physiological resistance of vectors to DDT as the countries of Central America have been, the countries of South America have instead had to cope with the changes of habit in vectors as efficient as A. darlingi and A. nuñeztovari, apart from the effects of the acute economic crisis, which have brought operations to a standstill in several of their programs. Obtaining foreign exchange for purchases of DDT abroad has in many instances become a formidable obstacle that they have found difficult to surmount. PAHO continues to serve the countries as an intermediary in solving this problem. The Procurement Office keeps up-to-date lists of international insecticide prices which it makes available to requesting governments, and itself makes purchases of products of foreign manufacture required for the conduct of health programs which are frequently difficult for the countries to acquire directly. Procurements are still frequently delayed by difficulties in obtaining foreign exchange; this also disrupts the schedules for sprayings, which are not applied at the requisite times and intervals.

The problems created by parasite resistance to drugs are greatest in South America, and particularly in Brazil and Colombia, which have had to establish treatment regimes to replace the usual chloroquine treatments in order to circumvent the resistance that P. falciparum has developed in many areas of the Amazon region, the Magdalena and Catatumbo river basins, and the Turbo region (see Map 7).

The use of new drugs, many of them more expensive than chloroquine, has created greater financial problems, which are serious burdens on the countries in which this resistance is present.

Human migrations continued to interfere with the conduct of programs. These migrations were still very heavy in the Brazilian Amazonian region and in some land-settlement areas of Colombia. Displacements of people owing to military hostilities in some countries slackened somewhat, to which some malariologists credited certain favorable conditions that had been seen in connection with the transmission of malaria. Movements of people in border areas are inevitable and difficult to control. Movements of this kind greatly affect countries that have achieved satisfactory control of the disease, who are hence compelled to maintain strict and very expensive surveillance in order to avert the reintroduction of malaria into areas now free of the disease.

In 1984 there were instances of unusually heavy rainfall and winds, but in no case did these phenomena reach disaster level. In Ecuador the consequences of the problems created by the "El Niño" current in 1983 were still being felt.

To summarize, the principal problem that faced the countries in 1984 was a lack of funding with which to address epidemiological problems. The financial crisis affected every single country, and rendered incomplete the measures taken. Seven countries reported endemic areas in which no control

measures were in progress for lack of money. The population so affected totaled 13,200 persons. Some countries also reported that the social and political disturbances taking place in them made it impossible to operate in the areas involved for the time being. In few countries no work could be done in some areas that were exceedingly hard to reach.

Other problems impeding the progress of the program were as follows:

- the difficulty of obtaining foreign exchange for public health activities, which were often given lower priority than other development activities;

- a reluctance of the population to accept spraying;

- pressure from local and international environmental protection groups opposed to the use of pesticides;

- extreme poverty in rural areas with makeshift housing in many localities, which receive little or no benefit from repeated applications of insecticides;

- risks of environmental pollution in areas growing crops or raising livestock for export.

The geographic distribution of areas in which major technical problems exist is illustrated in Table 20.

III. RESEARCH

Research in different fields, from epidemiology, entomology and vector control to immunology, chemotherapy and applied social science, continued to be carried out or were initiated in the Region during 1984. These endeavours were supported by the national malaria programs and research institutes from Brazil, Colombia, Dominican Republic, Guatemala, Honduras and Mexico, Universities in those countries and in the U.S.A., and specialized agencies such as the Brazilian Research Council, the US Agency for International Development, The National Institutes of Health, U.S.A., the Department of Defense, U.S.A., the UNDP/Special Programme for Research and Training in Tropical Diseases (TDR) and PAHO/WHO.

A. Field Research

Field research projects related to trials for the detection of infected mosquitoes in the Amazon Basin using the immunoradiometric assay (RIMA) and on the inhibition by human sera of the citoadherence test on Brazilian strains infected erythrocites were carried out. In the former, the dissecting method for detection of sporozoites and oocysts was compared with the RIMA and with an enzyme-linked immunoabsorbent assay (ELISA) using monoclonal antibodies to detect sporozoites in infected mosquitoes and to differentiate between plasmodia species.

The distribution of sentinel volunteer collaborator posts for malaria treatment and surveillance continued to be made in Guatemala. Two schemes were tested and compared with the national surveillance system. In one, volunteers administer treatment over three days to all individuals with suspected or self diagnosed malaria. In the other, a single dose was administered, followed by a blood film examination. If malaria was confirmed, patients were treated for three days. Although results still need more analysis, it seems that the methods tested produced an increase in the number of individuals treated as well as a decrease in the time between blood examination and treatment administration.

Several thesis leading to the MSc. degree on subjects related to malaria, such as an entomological study of the principal vector species in two communities; the population dynamics of Anopheles larval and on the larvae control of Anopheles Nuñez tovari were made in Colombia. In addition, techniques are being developed to initiate studies on seroepidemiology of malaria in Argentina, Honduras and Venezuela.

The spread of multiple resistance to insecticides of malaria vectors in Mexico, Central and South America, have lead to the exploration of alternative insecticides and their effect on mosquito behaviour. At the Malaria Research Center in Mexico, studies were made to determine the impact of two candidate insecticides, Bendiocarb and Deltametrin and an investigation was initiated on the vector capacity of A. albimanus. At this Center, a comparison was also made between a differential centrifugation method for detecting infection in mosquitoes and the ELISA test for the same purpose.

Operational research related to the testing of Cyflutrin in comparison with Deltametrin was carried out in Guatemala while in Honduras the use of more economic mixtures of insecticides (Fenitrothion and EC 50%) and the residual action of abate were investigated.

B. Socioeconomic Research

The recognition that social and economic factors play a fundamental role in the transmission and control of malaria has lead to the development of several research projects directed to get a better understanding of the social epidemiology of malaria in the Region.

A feasibility study on a project directed to clarify the economic and social determinants and consecuences of the transmission and control in two areas of the Amazon Region was initiated in Brazil. Attempts will be made using socioeconomic and epidemiological analyses, to identify risk factors, such as biological, economic, social, enviromental, behavioural, access to services, etc. that influence malaria infection, prevention and treatment.

A multidisciplinary team continued studies in Colombia, attempting to relate housing and other social and economic variables to the transmission of malaria. It is expected that this study will provide baseline data for revised control strategies of value to the national malaria service.

Another project in the same country was completed in 1984. An analysis of the social, economic and epidemiological determinants of malaria incidence and prevalence at the individual household and community levels was conducted to determine the impact of the disease upon labour productivity, individual household income, production and domestic activities. In addition, attempts were made to develop methodologies for the evaluation of the cost-benefit, cost-effectiveness and social benefits of the antimalaria campaign. Results from these studies identified the exposure rate to mosquito bites of those who work outdoors and the activities of the control programme as the variables which influenced more malaria incidence. On the other hand, it was difficult to detect the impact of malaria on productivity and production.

In Peru, another multidisciplinary team is analyzing how diverse social strata within a similar or different ethnic groups reacts to malaria (as well as to leishmaniasis). Socioeconomic factors, cultural and behavioural patterns and traditional medical practices are being study and analyzed, with the aim to develop appropiate health education activities and to assist the work of control programs in the jungle areas.

In the Dominican Republic, the National Malaria Service is continuing an investigation which is expected to lead to the defintion of more homogeneous areas for the application of control strategies than the present geographic regions. The understanding of the rural structure, in particular modes of production, economic changes, and the influx of migratory workers is considered crucial to assist in an operational stratification of the malaria control activities in order to concentrate resources in areas where incidence is likely to be higher. Results of this study began to be analyzed in 1984. Discussions had also been initiated with Haitian authorities in order to develop a complementary study to assess the impact of population movements in and out of malarious areas.

With the participation of PAHO Technical Programs on Tropical Diseases, Epidemiology and Health Manpower, the Office of Research Coordination and of consultants from Brazil, Mexico and the USA, a working group on social epidemiology of malaria met early in 1984. The group developed strategies to do a comparative study focused on the relationship among the epidemiologic profile of malaria, different modes of production in the rural sector and the impact of the migratory process. The methodological basis of the different phases of the project including sources and instruments for data collection and analysis; the needs of personnel and for personnel training; material and equipment and possible mechanisms of financial support and coordination were discussed. It was considered that this type of studies were an excelent opportunity to implement TCDC, and short and medium term activities were planned. General guidelines for developing the protocol to carry out such studies were made and distributed to Belize, Guatemala, Haiti, Honduras, and Mexico. Visits by PAHO staff and consultants were also made to different countries to promote project development. A protocol was developed in Panama and two projects were initiated in Brazil and Colombia. A third one will begin in Nicaragua in 1985.

C. Chemotherapy

A center in Brazil participated with others centers in outside the Region in the completion of a clinical trial on dose finding of mefloquine alone and a combination of mefloquine and sulfadoxine/ pyrimethamine. Studies on a combination of mefloquine and primaquine were also initiated in the Brazilian center in 1984.

Mefloquine* was registered in Switzerland and the triple combination (mefloquine, sulfadoxine and pyrimetamine)** in Switzerland and Thailand. They are indicated for prophilaxis and treatment of adults (except pregnant-women) and children over two years of age.

In order to maintain the usefulness of those products in the endemic countries were cloroquine resistant-strains of P. falciparum are present, the WHO Scientific Group on Chemotherapy of Malaria recommended in 1983: (a) that governments should legislate for strict control of the importation, distribution, and utilization of mefloquine alone or in drug combinations; (b) that the use of mefloquine by communities in endemic areas should be restricted to the treatment of acute malaria attacks that are likely to be due to multiple drug-resistant P. falciparum; (c) that, when available, drug combinations known to delay the development of drug resistance (as might be the case with the mefloquine/ sulfadoxine/ pyrimethamine combination currently under development) should be used for prophylaxis or treatment, when necessary, instead of mefloquine; and (d) that mefloquine should not be distributed for use as a single prophylactic drug by residents in endemic areas.

Given the fact that several reports indicate that after two or more dosis of the combination of sulfadoxine and pyrimetamine (Fansidar) may produce severe mucocutaneous reactions such as erythema multiforme, Stevens Johnson syndrome and toxic epidermal necrolysis; recommendations for chemoprophylaxis using that product was revised to balance the risk of using Fansidar with that of acquiring cloroquine resitant P. falciparum . However, Fansidar should not be administered if there is a previous history of adverse reactions to sulfonamides or pyrimetamina.

Studies continued on the methodology to evaluate P. falciparum drug sensitivity. Kits to test amodiaquine, quinine and quinidine were developed and added to the already available microkits for testing cloroquine and mefloquine. Quality control and evaluation of microtest plates for cloroquine and mefloquine susceptibility testing; quantitative assesment of antimalarial activity in vitro by a semiautomatic microdilution technique, and in vitro testing of antimalarial tissue schizonticides, were conducted in the USA. Cloning and characterization studies of isolates of P. falciparum from Brazil and on the effect of antimalarial drugs and its mode of action on gamecytogenesis and gametocytes of that specie of plasmodio were also carried out in the U.S.A.

In Colombia, it was shown that 97 out of 101 isolates of P. falciparum from different geographical areas were resistant to cloroquine in vitro, sixteen of those isolates, shown to be cloroquine resistant, were susceptible to Amodiaquine. Two isolates were found to be resistant to cloroquine and Mefloquine. Sensitivity to quinine was demonstrated in 57 P. falciparum isolates, while resistant to the sulfadoxine/pirmetamine combination were detected in vivo in 9 patients.

In the USA studies were also carried out on artesiminine and its active derivatives, sesquiterpene lactones. One of those was related with the sesquiterpene peroxide biosynthesis by Artemisia annua plants and tissue cultures. In addition, investigations were conducted on the metabolic pathways related to purine metabolism, a potential target for chemotherapy; on imidazoles and drug-resistant P. falciparum; the Redox status of red cells infected with the same parasite, the molecular analysis of drug resistance; and on the structural genes of malarial biosynthetic enzimes.

Centers in the USA tested a good number of potentially active new compounds against clones of P. falciparum of known drug sensitivity.

D. Immunology

The cloning of the gene coding for the major protective surface protein of sporozoites of P. falciparum was an important development in achieving th goal of a vaccine against malaria. Synthetic antigens or those made by recombinant DNA technology will be tested in 1985.

Projects carried out in the USA, among others, were directed to the cloning of the circumsporozoite (CS) antigen; synthesis of epitopes of the CS proteins, expression of surface antigens in procaryiote cells; protein analysis and antigens of plasmodial esporozoites, the localization and distribution of protective antigens of malaria parasites, and on the immunological analysis of purified malaria antigens. In addition, studies on receptors for merozoite invasion of erythrocytes, the physiology, biochemistry and antigenic analysis of cultured malaria parasites and infected red cells were pursued. In Colombia, studies had continued on the purification of antigens of merozoites of P. falciparum and its testing in Aotus tryvirgatus.

E. Diagnostic

Although microscopic detection of malaria parasites in thick blood films is rapid and accurate when parasitemia is relatively high, problems appear when parasitemia is low and/or great number of slides have to be examined. In addition, this technique is time consuming and requires well trained personnel. An interesting development was the possibility of using DNA probes for diagnostic purposes. This, would allow for rapid testing of blood samples from large population surveys. Until now, the sensitivity of the method is not as good as the microscopic examination of a thick blood film and the possibility of it being widely used depends on the development of a non radioisotopic method. Field testing of this assay is planned for 1985.

IV. TRAINING

The plan for the training of personnel of general health services in the elements of epidemiology and malaria control, launched in 1983, was continued in 1984 with the holding of three seminar-workshops in Colombia, Mexico and Honduras that were attended by 55 professionals of general health, malaria and epidemiological services, and in which the self-teaching modules developed by PAHO were used.

The workshops trained the national monitors who were to continue multiplying the training until the knowledge had been brought to all staff, including those employed in the most remote services, in each country.

The PAHO/WHO Fellowship Program was used to support training personnel of national malaria services in the following international courses:

1. Comprehensive Vector Control

Duration:	3 September - 26 October 1984
Place:	South Carolina, U.S.A.
Institution:	University of South Carolina
12 PAHO Fellowships:	3 Brazil, 1 Costa Rica, 2 Colombia, 2 Cuba, 1 Chile, 1 Mexico, 1 Peru, 2 Venezuela.

2. II Course on Vector Control

Duration:	27 February - 9 March 1984
Place:	South Carolina, U.S.A.
Institution:	University of South Carolina
7 PAHO Fellowships:	1 Belize, 1 Bahamas, 1 Dominica, 1 Grenada, 1 Guyana, 1 St. Christopher, 1 Suriname.

3. XL International Course in Malaria and Environmental Sanitation

Duration:	16 January - 2 November 1984
Place:	Maracay, Venezuela
Institution:	School of Malariology
4 PAHO Fellowships:	2 Bolivia, 1 Brazil, 1 Paraguay.

4. Course in Malariology

Duration:	3-1/2 months
Place:	Mexico
Institution:	School of Public Health and Malaria Control Program
3 PAHO Fellowships:	1 Guatemala, 2 Haiti.

5. Serologic Techniques

Duration:	Two months
Place:	Sao Paulo, Brazil
Institution:	University of Sao Paulo
2 PAHO Fellowships:	1 Costa Rica, 1 Dominican Rep., 1 Peru.

6. Refresher Course on Chagas' Disease, Leishmaniasis and Malaria

Duration:	Two weeks (October 1984)
Place:	Buenos Aires, Argentina
Institution:	Dr. Mario Fatala Chabén Institute for Diagnosis of and Research in Chagas Disease
2 PAHO Fellowships:	1 Mexico, 1 Paraguay

7. V Course on Vector Control

Duration:	One month (August 1984)
Place:	Bogota, Colombia
Institution:	Dirección de Campañas Directas
2 PAHO Fellowships:	2 Cuba

In addition to the foregoing courses, PAHO/WHO awarded the following fellowships and travel grants:

No.	Country of Origin	Duration	Activity and Place
1	Bolivia	3 months (March-May)	Vector Control, ARG
1	Cuba	2 weeks (September 1984)	Entomology, U.S.A.
1	Haiti	4 months (Sept-Dec 1984)	Malaria, France
1	Haiti	6 months (Oct-Nov 84)	Malaria, CDC Atlanta, U.S.A.
1	Haiti	1 month (Oct. 84)	Malaria, COL, PAN, GUA
1	Haiti	10 months (Jan-Oct 84)	Malaria, School of Public Health, VEN
1	Mexico	1 year	Research in Vector-Borne Diseases, South Carolina, U.S.A.
1	Peru	1 month (Sept. 84)	Malaria, COL
1	Peru	1 month (Nov 84)	Malaria, COL, VEN, MEX
1	Dom. Rep.	2 weeks (July 84)	Malaria, PAN
1	Trinidad & Tobago	2 weeks (Aug 84)	Vector Control, BRA

According to information provided by the countries, during the year 1,600 staff members of national malaria services were trained and retrained in courses and workshops given in the countries for different categories of personnel (see Table 21).

Table 1

MALARIA MORBIDITY IN THE AMERICAS
1958 - 1984

Year	Population		Blood Slides			Morbidity per 100,0 inhabitants	
	Total Countries	Total malarious areas	Examined	Positive	%	Total Countries	malarious areas
1958	387 276	135 409	1 716 103	56 705	3.3	14.64	41.88
1959	394 606	145 920	2 749 117	75 612	2.8	19.16	51.82
1960	400 500	143 586	3 955 149	79 998	2.0	19.88	55.71
1961	416 008	147 292	5 341 004	99 539	1.9	23.93	67.58
1962	427 919	153 742	7 221 367	177 089	2.5	41.38	115.19
1963	434 950	152 021	7 903 156	227 026	2.9	52.20	149.34
1964	447 666	158 642	8 156 290	254 572	3.1	56.87	160.47
1965	455 527	146 389	9 069 950	241 462	2.7	53.01	164.95
1966	463 649	166 469	11 797 983	333 280	2.8	71.88	200.21
1967	474 868	169 901	11 609 228	369 388	3.2	77.79	217.41
1968	484 664	174 704	12 522 696	282 773	2.3	58.34	161.86
1969	491 483	176 325	12 179 190	323 782	2.7	65.88	183.63
1970	505 819	181 257	9 925 162	344 170	3.5	68.04	189.88
1971	513 544	185 492	10 134 212	338 416	3.3	65.90	182.44
1972	524 774	190 448	9 695 953	284 813	2.9	54.23	149.55
1973	535 109	195 528	9 400 682	280 276	3.0	52.38	143.34
1974	544 865	200 755	8 997 318	269 003	3.0	49.37	134.00
1975	555 676	205 872	9 276 878	356 692	3.8	64.19	173.26
1976	565 249	211 086	9 352 775	379 364	4.1	67.11	179.72
1977	576 942	215 550	9 274 480	398 925	4.3	69.14	185.07
1978	587 704	220 153	9 493 751	468 923	4.9	79.84	213.00
1979	600 263	226 361	8 630 653	515 271	6.0	85.84	227.63
1980	610 021	231 366	8 943 369	602 836	6.7	98.82	260.56
1981	627 375	239 260	9 100 529	629 629	7.0	100.36	263.16
1982	635 954	245 307	8 826 418	715 177	8.1	112.46	291.54
1983	639 212	249 327	9 113 611	830 700	9.1	129.96	333.18
1984	659 535	257 276	9 422 827	914 171	9.7	138.61	355.33

MAP 1

GROUP I. COUNTRIES WITH NO EVIDENCE OF MALARIA TRANSMISSION

	Population (1984) Originally malarious area	Cases Registered			
		1981	1982	1983	1984
Chile	261	0	0	0	0
Cuba	3,350	573	335	298	401
Dominica	16	0	0	0	0
Grenada	44	0	0	0	0
Guadeloupe	283	0	1	1	0
Jamaica	1,705	1	1	4	5
Martinique	194	1	7	1	0
Saint Lucia	108	0	0	0	0
Trinidad & T.	1,159	3	4	3	6
United States	67,338	1,010	622	605	791
Puerto Rico	3,399	11	2	2	2
Virgin Isl.	96	0	0	0	0
T O T A L	77,953	1,599	972	914	1,205

MAP 2

GROUP II. COUNTRIES WHERE MALARIA TRANSMISSION HAS BEEN REDUCED AND FAVORABLE SITUATION MAINTAINED

GROUP II	Population 1984) malariuous ares	Cases Registered 1981	1982	1983	1984
Argentina	3,752	323	567	535	437
Costa Rica	718	168	110	245	559
Panama	2,037	340	334	341	125
Paraguay	2,701	73	66	49	524
T O T A L	9,208	904	1,077	1,170	1,645

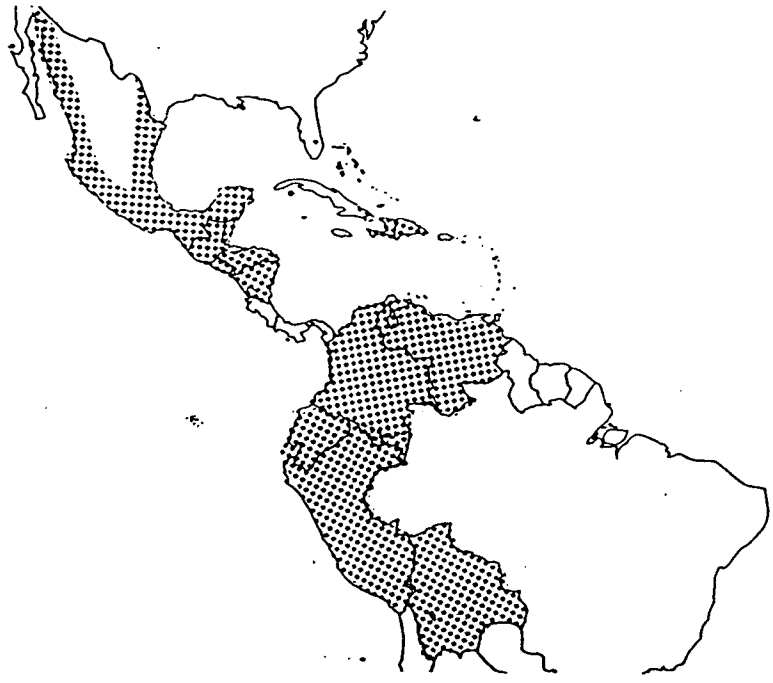
MAP 3

GROUP III. COUNTRIES WHERE MALARIA IS INCREASING IN ENDEMIC AREAS

GROUP III	Population (1984) Originally malarious areas	Cases Registered 1981	1982	1983	1984
Brasil	55,927	197,149	221,939	297,687	378,257
French Guiana	73	769	1,143	1,051	1,021
Guyana	836	2,065	1,700	2,102	3,017
Suriname	281	2,479	2,805	1,943	3,849
T O T A L	57,117	202,462	227,587	302,783	386,144

MAP 4

GROUP IV. COUNTRIES WITH SERIOUS SOCIOECONOMIC, POLITICAL, TECHNICAL, ADMINISTRATIVE AND FINANCIAL PROBLEMS



GROUP IV	Population (1984) Originally malarious areas	Cases Registered 1981	1982	1983	1984
Subregion A:					
Dominican Rep.	6,060	3,596	4,654	3,801	2,370
Haiti	4,818	46,703	65,354	53,954	54,896
Subregion B:					
Belize	160	2,041	3,868	4,595	4,117
El Salvador	4,132	93,187	86,202	65,377	66,874
Guatemala	3,104	67,994	77,375	64,024	74,132
Honduras	3,867	49,377	57,482	37,536	27,332
Mexico	41,639	42,104	49,993	75,029	85,501
Nicaragua	3,165	17,434	15,601	12,907	15,702
Subregion C:					
Bolivia	2,469	9,774	6,699	14,441	16,338
Colombia	18,600	60,972	78,601	105,360	55,268
Ecuador	5,276	12,745	14,633	51,606	78,599
Peru	6,361	14,812	20,483	28,563	32,621
Venezuela	13,156	3,377	4,269	8,400	11,127
T O T A L	112,807	424,116	485,214	525,593	524,877

a) Information up to september. b) Information up to October.
c) Information up to November

Table 2

MALARIA CASES REGISTERED, 1981-1984

GROUPS		Population 1984 a) Malarious areas	Registered Cases 1981	1982	1983	1984
GROUP I	Countries or territories in which malaria eradication has been certified b)	77,953	1,599	972	914	1,206
GRUPO II	Argentina	3,752	323	567	535	437
	Costa Rica	718	168	110	245	569
	Panama	2,037	340	334	341	125
	Paraguay	2,701	73	66	49	554
	Sub-total	9,208	904	1,077	1,170	1,685
GROUP III	Brazil	55,927	197,149	221,939	297,687	378,257
	French Guiana	73	769	1,143	1,051	1,021
	Guyana	836	2,065	1,700	2,102	3,017
	Suriname	281	2,479	2,805	1,943	3,849
	Sub-total	57,117	202,462	227,587	302,783	386,144
GROUP IV	Subregion A:					
	Dominican Rep.	6,060	3,596	4,654	3,801	2,370
	Haiti	4,818	46,703	65,354	53,954	54,896 c)
	Subregion B:					
	Belize	160	2,041	3,868	4,595	4,117
	El Salvador	4,132	93,187	86,202	65,377	66,874
	Guatemala	3,104	67,994	77,375	64,024	74,132
	Honduras	3,867	49,377	57,482	37,536	27,332
	Mexico	41,639	42,104	49,993	75,029	85,501
	Nicaragua	3,165	17,434	15,601	12,907	15,702
	Subregion C:					
	Bolivia	2,469	9,774	6,699	14,441	16,338
	Colombia	18,600	60,972	78,601	105,360	55,268
	Ecuador	5,276	12,745	14,633	51,606	78,599
	Peru	6,361	14,812	20,483	28,563	32,621 d)
	Venezuela	13,156	3,377	4,269	8,400	11,127 e)
	Sub-total	112,807	424,116	485,214	525,593	524,877
	T O T A L	257,085	629,081	714,850	830,460	913,912

a) Population in thousands. b) 12 countries or territories. c) Information up to September. d) Information up to October. e) Information up to November.

Table 3

POPULATION IN THE MALARIOUS AREAS
IN THE AMERICAS, 1958 - 1984
(Population in thousands)

Year	Originally malarious areas					Total Population
	Maint. phase	Consolid. phase	Attack Fase	Prep. phase or program not yet started	Total	
1958	52 866	1 996	46 196	34 351	135 409	387 276
1959	52 856	9 349	56 292	27 423	145 920	394 606
1960	54 363	10 101	53 400	25 722	143 586	400 500
1961	56 979	17 879	39 021	33 413	147 292	416 008
1962	59 299	30 424	49 276	14 743	153 742	427 919
1963	56 546	33 901	31 910	29 664	152 021	434 950
1964	57 414	32 277	34 426	34 525	158 642	447 666
1965	60 975	34 731	38 575	12 108	146 389	455 527
1966	69 760	36 128	43 369	17 212	166 469	463 649
1967	70 720	41 581	44 766	12 834	169 901	474 868
1968	72 441	45 812	56 234	217	174 704	484 664
1969	72 757	46 987	56 375	206	176 325	491 483
1970	80 770	40 518	59 807	162	181 257	505 819
1971	81 306	43 644	60 396	146	185 492	513 544
1972	86 634	42 016	61 645	153	190 448	524 774
1973	87 969	45 535	61 915	109	195 528	535 109
1974	91 527	46 042	63 130	56	200 755	544 865
1975	99 405	44 633	61 834	-	205 872	555 676
1976	101 068	48 813	61 205	-	211 086	565 249
1977	104 567	50 610	60 373	-	215 550	576 942
1978	105 611	59 734	54 808	-	220 153	587 704
1979	113 092	57 280	55 989	-	226 361	600 263
1980	114 620	58 087	58 659	-	231 366	610 021
1981	117 042	59 962	62 256	-	239 260	627 375
1982	118 338	62 028	64 941	-	245 307	635 954
1983	119 175	66 970	63 182	-	249 327	639 212
1984	124 408	68 420	64 448	-	257 535	659 535

Table 4

STATUS OF THE MALARIA PROGRAMS IN THE AMERICAS, BY POPULATION, 1984
(Population in thousands)

Country or other political or administrative unit	Total Population	Population of originally malarious areas							
		Total Mal.area		Mantenimiento		Consolidation		Attack	
	a)	Total	%	Total	%	Total	%	Total	%
Antigua	79	-	-	-	-	-	-	-	-
Argentina	30,249	3,752	12.40	3,584	95.52	79	2.11	89	2.37
Bahamas	223	-	-	-	-	-	-	-	-
Barbados	252	-	-	-	-	-	-	-	-
Belize	160	160	100.00	28	17.50	0	0.00	132	82.50
Bermuda	57	-	-	-	-	-	-	-	-
Bolivia	6,253	2,469	39.49	0	0.00	0	0.00	2,469	100.00
Brazil	132,025	55,927	42.36	14,838	26.53	21,797	38.97	19,292	34.49
British Virgin Islands	13	-	-	-	-	-	-	-	-
Canada	25,206	-	-	-	-	-	-	-	-
Cayman Islands	20	-	-	-	-	-	-	-	-
Chile	11,879	261	2.20	261	100.00	-	-	-	-
Colombia	28,500	18,600	65.26	0	0.00	13,513	72.65	5,087	27.35
Costa Rica	2,511	718	28.59	0	0.00	618	86.07	100	13.93
Cuba	9,940	3,350	33.70	3,350 b)	100.00	-	-	-	-
Dominica	80	16	20.00	16 b)	100.00	-	-	-	-
Dominican Republic	6,102	6,060	99.31	5,916	97.62	51	0.84	93	1.53
Ecuador	8,823	5,276	59.80	-	-	2,306	43.71	2,970	56.29
El Salvador	4,593	4,133	89.98	-	-	-	-	4,133	100.00
Falkland Islands	2	-	-	-	-	-	-	-	-
French Guiana	73	73	100.00	38	52.05	30	41.10	5	6.85
Estados Unidos de Amer.	236,274	67,338	28.50	67,338 b)	100.00	-	-	-	-
Grenada	110	44	40.00	44 b)	100.00	-	-	-	-
Guadeloupe	318	283	88.99	283 b)	100.00	-	-	-	-
Guatemala	7,527	3,104	41.24	-	-	-	-	3,104	100.00
Guyana	836	836	100	751	89.83			85	10.17
Haiti	5,054	4,818	95.33	-	-	-	-	4,818	100.00
Honduras	4,232	3,867	91.38	-	-	-	-	3,867	100.00
Islas Virgenes (EUA)	96	96	100.00	96 b)	100.00	-	-	-	-
Jamaica	2,288	1,705	74.52	1,705 b)	100.00	-	-	-	-
Martinique	311	194	62.38	194 b)	100.00	-	-	-	-
Mexico	82,395	41,829	50.77	6,148	14.70	23,837	56.99	11,844	28.32
Montserrat	13	-	-	-	-	-	-	-	-
Netherland Antilles	258	-	-	-	-	-	-	-	-
Nicaragua	3,165	3,165	100.00	-	-	-	-	3,165	100.00
Panama	2,134	2,037	95.45	-	-	1,856	91.11	181	8.89
Paraguay	3,179	2,701	84.96	737	27.29	1,306	48.35	658	24.36
Peru	19,198	6,361	33.13	1,759	27.65	2,947	46.33	1,655	26.02
Puerto Rico	3,399	3,399	100.00	3,399 b)	100.00	-	-	-	-
Saint Kitts, Nevis-Ang.	53	-	-	-	-	-	-	-	-
Saint Lucia	128	108	84.38	108 b)	100.00	-	-	-	-
Saint Pierre & Miquelon	6	-	-	-	-	-	-	-	-
Saint Vincent	102	-	-	-	-	-	-	-	-
Suriname	352	281	79.83	249	88.61	3	1.07	29	10.32
Trinidad & Tobago	1,220	1,159	95.00	1,159 b)	100.00	-	-	-	-
Turks & Caicos	6	-	-	-	-	-	-	-	-
United States of Amer.									
Uruguay	2,990		-	-	-	-	-	-	-
Venezuela	16,851	13,156	78.07	12,407 c)	94.31	29	0.22	720	5.47
Virgin Islands (USA)	96	96	100.00	96 b)	100.00	-	-	-	-
T o t a l	659,535	257,276	39.01	124,408	48.36	68,372	26.58	64,496	25.07

a) Population in thousands. Population living in areas where eradication of malaria has been registered by PAHO/WHO. c) Includes an area with 9,835,167 inhabitants where malaria eradication has been registered by PAHO/WHO.
registrada por la OPS/OMS

Table 5

STATUS OF THE MALARIA PROGRAMS IN THE AMERICAS, BY AREA, 1984
(Area In Km2)

Country or other political or administrative unit	Total area	Originally malarious areas							
		Total Mal. areas		Mantenimiento		Consolidation		Attack	
		Total	%	Total	%	Total	%	Total	%
Antigua	280	-	-	-	-	-	-	-	-
Argentina	4,024,458	349,051	8.67	334,527	95.84	3,249	0.93	11,275	3.23
Bahamas	11,396	-	-	-	-	-	-	-	-
Barbados	430	-	-	-	-	-	-	-	-
Belize	22,965	22,965	100.00	3,962	17.25	7,150	31.13	11,853	51.61
Bermuda	53	-	-	-	-	-	-	-	-
Bolivia	1,098,581	821,346	74.76	-	-	-	-	821,346	100.00
Brazil	8,511,965	6,898,045	81.04	190,469	2.76	1,226,413	17.78	5,481,163	79.46
British Virgin Islands	174	-	-	-	-	-	-	-	-
Canada	9,221,016	-	-	-	-	-	-	-	-
Cayman Islands	183	-	-	-	-	-	-	-	-
Chile	756,626	58,073	7.68	58,073	100.00	-	-	-	-
Colombia	1,138,914	970,849	85.24	-	-	156,863	16.16	813,986	83.84
Costa Rica	50,900	35,446	69.64	-	-	27,832	78.52	7,614	21.48
Cuba	110,922	37,502	33.81	37,502 a)	100.00	-	-	-	-
Dominica	751	152	20.24	152 a)	-	-	-	-	-
Dominican Republic	48,442	47,562	98.18	44,281	93.10	1,096	2.30	2,185	4.59
Ecuador	291,906	175,462	60.11	-	-	27,797	15.84	147,665	84.16
El Salvador	21,041	19,153	91.03	-	-	-	-	19,153	100.00
Falkland Islands	11,961	-	-	-	-	-	-	-	-
French Guiana	90,000	90,000	100.00	50	0.06	82,350	91.50	7,600	8.44
Grenada	344	103	29.94	103 a)	100.00	-	-	-	-
Guadeloupe	1,950	1,244	63.79	1,244 a)	-	-	-	-	-
Guatemala	108,889	80,350	-	-	-	-	-	80,350	100.00
Guyana	215,025	215,025	100.00	7,012	3.26	-	-	208,013	96.74
Haiti	27,750	23,545	84.85	-	-	-	-	23,545	100.00
Honduras	112,088	101,351	90.42	-	-	-	-	101,351	100.00
Jamaica	11,428	10,028	87.75	10,028 a)	100.00	-	-	-	-
Martinique	1,080	300	27.78	300 a)	-	-	-	-	-
Mexico	1,967,183	1,150,000	58.46	190,952	16.60	546,433	47.52	412,615	35.88
Montserrat	84	-	-	-	-	-	-	-	-
Netherlands Antilles	961	-	-	-	-	-	-	-	-
Nicaragua	127,358	118,358	92.93	-	-	-	0.00	118,358	100.00
Panama	77,082	71,272	92.46	-	-	35,290	49.51	35,982	50.49
Paraguay	406,752	406,552	99.95	271,010	66.66	80,749	19.86	54,793	13.48
Peru	1,285,215	961,171	74.79	195,418	20.33	222,330	23.13	543,423	56.54
Puerto Rico	8,899	8,899	100.00	8,899	-	-	-	-	-
St. Kitts, Nevis-Anguilla	396	-	-	-	-	-	-	-	-
Saint Lucia	620	510	82.26	510 a)	100.00	-	-	-	-
St. Pierre & Miquelon	240	-	-	-	-	-	-	-	-
Saint Vincent	389	-	-	-	-	-	-	-	-
Suriname	163,820	163,750	99.96	43,705	26.69	45	0.03	120,000	73.28
Trinidad y Tabago	5,630	5,449	96.79	5,449	100.00	-	-	-	-
Turks and Caicos	522	-	-	-	-	-	-	-	-
United States of Amer.	9,365,604	2,309,876	24.66	2,309,876 a)	-	-	-	-	-
Uruguay	186,926	-	-	-	-	-	-	-	-
Venezuela	915,741	600,000	65.52	460,054 b)	76.68	343	0.06	139,603	23.27
Virgin Islands (USA)	345	345	100.00	345 a)	100.00	-	-	-	-
T o t a l	40,404,940	15,753,734	38.99	4,173,921	26.49	2,417,940	15.35	9,161,873	58.16

a) Areas where malaria eradication has been registered by PAHO/WHO.
b) Includes an area of 407,945 km2 where malaria eradication has been registered by PAHO/WHO.

Table 6

CASE DETECTION BY COUNTRY AND PHASE OF PROGRAM, 1984

Country or other political or administrative unit	Total		Maintenance		Consolidation		Attack phase		Non-malarious areas	
	Slides examined	Positive	Slides examined	Positive	Slides examined	Positive	Slides examined	Positive	Laminas examinada	Positivas
Argentina	24,943	437	15,103	175	1,484	7	8,355	254	1	1
Bahamas	3	3	-	-	-	-	-	-	3	3
Barbados	2	2	-	-	-	-	-	-	2	2
Belize	31,146	4,117	3,650	82	3,412	331	24,084	3,704	-	-
Bolivia	99,003	16,338	-	-	-	-	99,003	16,338	-	-
Brazil	3,277,492	378,257	129,352	1,037	759,373	5,021	2,342,683	367,426	46,084	4,773
Canada	254	254	-	-	-	-	-	-	254	254
Colombia	407,627	55,268	-	-	145,443	2,671	262,184	52,597	-	-
Costa Rica	103,987	569	-	-	61,919	353	40,381	146	1,687	70
Cuba	551,267	401	551,267	401	-	-	-	-	-	-
Dominica	0	0	0	0	-	-	-	-	-	-
Dominican Repub.	413,416	2,370	372,890	1,551	11,219	60	29,163	759	144	0
Ecuador	408,465	78,599	-	-	121,668	11,932	285,884	66,530	913	137
El Salvador	270,156	66,874	-	-	-	-	270,156	66,874	-	-
French Guiana	10,498	1,021	4,259	92	3,313	306	2,926	623	-	-
Grenada	4,356	0	4,356	0	-	-	-	-	-	-
Guadeloupe	0	0	0	0	-	-	-	-	-	-
Guatemala	526,694	74,132	-	-	-	-	508,980	71,743	17,714	2,389
Guyana	29,207	3,017	14,240	432	-	-	14,967	2,585	-	-
Haiti a)	254,712	54,896	-	-	-	-	254,712	54,896	-	-
Honduras	452,184	27,332	-	-	-	-	449,979	27,164	2,205	168
Jamaica	1,336	5	1,336	5	-	-	-	-	-	-
Martinique	0	0	0	0	-	-	-	-	-	-
Mexico	1,093,953	85,501	24,665	141	369,756	12,483	689,190	72,419	10,342	458
Nicaragua	451,943	15,702	-	-	-	-	451,943	15,702	-	-
Panama	373,072	125	-	-	199,174	17	173,898	108	-	-
Paraguay	107,662	554	7,290	0	41,994	8	57,839	544	539	2
Peru b)	214,213	32,621	34,341	1,540	120,074	16,964	59,798	14,117	-	-
Puerto Rico	2	2	2	2	-	-	-	-	-	-
Saint Lucia	0	0	0	0	-	-	-	-	-	-
Suriname	66,609	3,849	1,752	8	4,925	225	45,865	3,261	14,067	355
Trinidad & Tab.	6,335	6	6,335	6	-	-	-	-	-	-
United States	792	792	792	792	-	-	-	-	-	-
Venezuela d)	241,498	11,127	130,636	5,854	2,145	7	107,065	4,828	1,652	438
TOTAL	9,422,827	914,171	1,302,266	12,118	1,845,899	50,385	6,179,055	842,618	95,607	9,050

a) Information up to September. b) Information up to October. c) Information up to November.

Table 7

EPIDEMIOLOGICAL SITUATION OF THE 21 COUNTRIES WITH ACTIVE MALARIA PROGRAMS, 1984

Country	Population Malarious areas	Blood slides		Species of parasites				Epidemiological Indicators*			
		Examined	Posit.	P. falc.	P. vivax	P.mal.	Mixed	ABER	SPR	API	% of P.falc.
Argentina	3,752	24,943	437	0	436	1	0	0.66	1.75	0.12	0.00
Belize	160	31,146	4,117	521	3,596	0	0	19.47	13.22	25.73	12.65
Bolivia	2,469	99,003	16,338	1,196	15,120	0	22	4.01	16.50	6.62	7.32
Brazil	55,927	3,277,492	378,257	202,230	171,836	7	4,184	5.86	11.54	6.76	53.46
Colombia	18,600	407,627	55,268	19,273	35,776	81	138	2.19	13.56	2.97	34.87
Costa Rica	718	103,987	569	9	560	0	0	14.48	0.55	0.79	1.58
Rep. Dominicana	6,060	413,416	2,370	2,370	0	0	0	6.82	0.57	0.39	100.00
Ecuador	5,276	408,465	78,599	15,620	62,962	0	17	7.74	19.24	14.90	19.87
El Salvador	4,133	270,156	66,874	11,172	55,292	0	410	6.54	24.75	16.18	16.71
Guay. Francesa	73	10,587	1,021	916	102	0	3	14.50	9.64	13.99	89.72
Guatemala	3,104	526,694	74,132	6,270	67,597	0	265	16.97	14.07	23.88	8.46
Guyana	836	29,207	3,017	423	2,585	1	8	3.49	10.33	3.61	14.02
Haiti a)	3,818	254,712	54,896	54,895	1	0	0	6.67	21.55	19.17	100.00
Honduras	3,867	452,184	27,332	1,511	25,743	0	78	11.69	6.04	7.07	5.53
Mexico	41,829	1,093,953	85,501	1,146	84,214	4	137	2.62	7.82	2.04	1.34
Nicaragua	3,165	451,943	15,702	615	15,056	0	31	14.28	3.47	4.96	3.92
Panama	2,037	373,072	125	78	47	0	0	18.31	0.03	0.06	62.40
Paraguay	2,701	107,662	554	16	535	0	3	3.99	0.51	0.21	2.89
Peru b)	6,361	214,213	32,621	51	32,553	17	0	3.37	15.23	6.16	0.16
Suriname	281	66,609	3,849	3,665	184	0	0	23.70	5.78	13.70	95.22
Venezuela c)	11,580	241,498	11,127	3,335	7,765	4	23	2.09	4.61	1.05	29.97
T O T A L	176,747	8,858,569	912,706	325,312	581,960	115	5,319	5.01	10.30	5.16	0.18

* ABER = Annual Blood Examination Rate
SPR = Slide Positive Rate
API = Annual Parasite Incidence

a) Information up to September. b) Information up to October. c) Information up to November

Table 8

SLIDES EXAMINED AND POSITIVES, BY SPECIE AND CLASSIFICATION
MAINTENANCE PHASE, 1984

Country	Blood slides examined	Total positives	Specie of parasites			Classification of cases								
			P.falc.	P. vivax	P. mal.	Mixed Inf.	Autoch-thonous	Relaps-ing	Imported From abroad	Imported From other areas	In-duced	Intro-duced	Criptic and un-classi-fied	No in-vesti-gated
Argentina	15,103	175	-	175	-	-	141	5	16	4	-	2	5	2
Belize	3,650	82	9	73	-	-	-	-	-	-	-	-	-	82
Brazil	129,352	1,037	333	662	1	41	79	9	2	895	2	2	2	46
Cuba	551,267	401 a)	228	166	2	1	-	-	394	-	-	7	-	-
Dominica	0	0	-	-	-	-	-	-	-	-	-	-	-	-
Dominican Rep.	372,890	1,551	1,551	-	-	-	471	-	57	-	-	7	-	1,016
French Guiana	4,259	92	80	12	-	-	-	-	14	67	-	-	8	3
Grenada	4,356	0	-	-	-	-	-	-	-	-	-	-	-	-
Guadalupe	0	0	-	-	-	-	-	-	-	-	-	-	-	-
Guyana	14,240	432	30	401	1	-	-	-	5	427	-	-	-	-
Jamaica	1,336	5	4	1	-	-	-	-	5	-	-	-	-	-
Martinique	0	0	-	-	-	-	-	-	-	-	-	-	-	-
Mexico	24,665	141	-	141	-	-	2	-	-	-	-	-	139	-
Paraguay	7,290	0	-	-	-	-	-	-	-	-	-	-	-	-
Peru b)	34,341	1,540	-	1,540	-	-	1,515	-	-	22	-	-	-	3
Puerto Rico	2	2 c)	-	1	-	-	-	-	2	-	-	-	-	-
Saint Lucia	0	0	-	-	-	-	-	-	-	-	-	-	-	-
Suriname	1,752	8	8	-	-	-	-	-	-	4	-	-	-	4
Trinidad & Tabago	6,335	6	2	4	-	-	-	-	-	6	-	-	-	-
United States	792	792 d)	201	477	39	3	-	-	791	-	-	-	-	(e)
Venezuela f)	130,636	5,854	2,637	3,212	1	4	1,525	5	53	457	25	3,789	-	-
T o t a l	1,302,266	12,118	5,083	6,865	44	49	3,733	19	1,339	1,882	27	3,807	154	1,156

a) Four cases P. ovale. b) Information up to October. c) One case with unknown specie. d) 19 cases P. ovale and 53 with unknown specie.
e) One congenital case. f) Information up to November.

Table 9

SLIDES EXAMINED AND POSITIVES, BY SPECIE AND CLASSIFICATION
CONSOLIDATION PHASE, 1984

Country	Blood slides examined	Total positive	Specie of parasites			Classification of cases								
			P. falc.	P.vivax	P.mal.	Mixed Inf.	Autoch-thonous	Relaps-ing	Imported From abroad	Imported From other areas	In-duced	Intro-duced	Cryptic and un-classi fied	No in-vesti-gated
Argentina	1,484	7	-	7	-	-	-	-	3	-	-	-	4	-
Belize	3,412	331	78	253	-	-	-	-	-	328	-	-	-	3
Brazil	759,373	5,021	2,168	2,779	1	73	767	8	19	3,752	5	121	11	338
Colombia	145,443	2,671	446	2,220	-	5	1,282	4	12	256	7	20	197	893
Costa Rica	61,919	353	2	351	-	-	161	-	129	63	-	-	-	-
Dominican Rep.	11,219	60	60	-	-	-	18	-	-	-	-	3	-	39
Ecuador	121,668	11,932	1,709	10,217	-	6	7,193	7	2	1,789	-	211	1	2,729
French Guiana	3,313	306	240	63	-	3	227	-	12	62	-	-	1	4
Mexico	369,756	12,483	196	12,270	-	17	416	23	7	...	3	4	-	12,030
Panama	199,174	17	9	9	-	-	-	-	15	-	-	2	-	-
Paraguay	41,994	8	-	8	-	-	4	-	-	3	-	-	1	-
Peru a)	120,074	16,964	9	16,954	1	-	...	...	...	...	...	...	...	...
Suriname	4,925	225	225	-	-	-	-	-	14	94	-	-	-	117
Venezuela b)	2,145	7	-	7	-	-	1	-	1	1	-	4	-	-
T o t a l	1,845,899	50,385	5,142	45,138	2	104	10,069	42	214	6,348	15	365	215	16,153

a) Information up to October. b) Information up to November

Table 10

SLIDES EXAMINED AND POSITIVES BY SPECIE
ATTACK PHASE, 1984

Country	Slides examined			Specie of parasites			
	Examined	Positive	%	P. falci parum	P.vivax	P. malariae	Mixed Inf.
Argentina	8,355	254	3.04	-	254	-	-
Belize	24,084	3,704	15.38	434	3,270	-	-
Bolivia	99,003	16,338	16.50	1,196	15,120	-	22
Brazil	2,342,683	367,426	15.68	197,959	165,555	4	3,908
Colombia	262,184	52,597	20.06	18,827	33,556	81	133
Costa Rica	40,381	146	0.36	3	143	-	-
Dominican Rep.	29,163	759	2.60	759	-	-	-
Ecuador	285,884	66,530	23.27	13,908	52,611	-	11
El Salvador	270,156	66,874	24.75	11,172	55,292	-	410
French Guiana	2,926	623	21.29	596	27	-	-
Guatemala	508,980	71,743	14.10	6,190	65,290	-	263
Guyana	14,967	2,585	17.27	393	2,184	-	8
Haiti a)	254,712	54,896	21.55	54,895	1	-	-
Honduras	449,979	27,164	6.04	1,499	25,588	-	77
Mexico	689,190	72,419	10.51	950	71,349	-	120
Nicaragua	451,943	15,702	3.47	615	15,056	-	31
Pamama	173,898	108	0.06	70	38	-	-
Paraguay	57,839	544	0.94	16	525	-	3
Peru b)	59,798	14,117	23.61	42	14,059	16	-
Suriname	45,865	3,261	7.11	3,086	175	-	-
Venezuela d)	107,065	4,828	4.51	645	4,162	3	18
T O T A L	6,179,055	842,618	13.64	313,255	524,255	104	5,004

a) Information up to September. b) Information up to October. c) Information up to November

Table 11

SLIDES EXAMINED AND POSITIVES BY SPECIE
NON-MALARIOUS AREAS, 1984

Country	Slides examined			Specie of parasites			
	Examined	Positive	%	P. falci parum	P.vivax	P. malariae	Mixed Inf.
Argentina	1	1	100.00	-	-	1	-
Bahamas	3	3	100.00	...	...	...	...
Barbados	2	2	100	...	...	...	...
Brazil	46,084	4,773	10.36	1,770	2,840	1	162
Canada	254	254	100.00	...	...	...	...
Costa Rica	1,687	70	4.15	4	66	-	-
Rep. Dominicana	144	0	0.00	-	-	-	-
Ecuador	913	137	15.01	3	134	-	-
Guatemala	17,714	2,389	13.49	80	2,307	-	2
Honduras	2,205	168	7.62	12	155	-	1
Mexico	10,342	458	4.43	-	454	4	-
Paraguay	539	2	0.37	-	2	-	-
Suriname	14,067	355	2.52	346	9	-	-
Venezuela a)	1,652	438	26.51	53	384	-	1
T O T A L	95,607	9,050	9.47	2,269	6,351	6	166

... No information available
a) Information up to November

Table 12

COMPARATIVE RESULTS OF ACTIVE AND PASSIVE CASE DETECTION IN THE MALARIA PROGRAMS IN THE AMERICAS, 1985

Country	Number of Evaluators	Active case detection				Passive case detection				TOTAL		
		Blood Slides examined	Positive	%	Average productive Not. post per month	Blood Slides examined	Positive	%	Average Slides per Productive Not. post	Blood Slides examined	Positive	%
Argentina	98	19,094	304	1.59	94	5,849	133	2.27	5.19	24,943	437	1.75
Bahamas	-	-	-	-	-	-	-	-	-	3	3	100.00
Barbados	-	-	-	-	-	-	-	-	-	2	2	100.00
Belize	11	11,145	1,246	11.18	1,229	20,001	2,871	14.35	1.36	31,146	4,117	13.22
Bolivia	94	69,352	5,273	7.60	820	29,651	11,065	37.32	3.01	99,003	16,338	16.50
Brazil	...	1,627,514	39,471	2.43	24,856	1,649,978	338,786	20.53	5.53	3,277,492	378,257	11.54
Canada	-	-	-	-	-	-	-	-	-	254	254	100.00
Colombia	...	118,232	7,657	6.48	3,912	289,395	47,611	16.45	6.16	407,627	55,268	13.56
Costa Rica	109	100,831	389	0.39	288	3,156	180	5.70	0.91	103,987	569	0.55
Cuba	-	11,902	-	-	-	539,365	401	0.07	-	551,267	401	0.07
Dominican Rep.	162	338,729	1,478	0.44	2,085	74,687	892	1.19	2.99	413,416	2,370	0.57
Ecuador	165	53,758	3,150	5.86	4,296	354,707	75,449	21.27	6.88	408,465	78,599	19.24
El Salvador	79	3,470	745	21.47	...	266,686	66,129	24.80	-	270,156	66,874	24.75
French Guiana	...	4,367	130	2.98	12	6,131	891	14.53	42.58	10,498	1,021	9.73
Grenada	-	-	-	-	-	4,356	0			4,356	0	-
Guatemala	84	504,666	70,257	13.92	4,384	22,028	3,875	17.59	0.42	526,694	74,132	14.07
Guyana	37	...	...	-	104	...	...	-	-	29,207	3,017	10.33
Haiti a)	...	18,452	1,213	6.57	135	236,260	53,683	22.72	145.84	254,712	54,896	21.55
Honduras	108	111,325	861	0.77	4,737	340,859	26,471	7.77	6.00	452,184	27,332	6.04
Jamaica	...	-	-	-	-	1,336	5	0.37	-	1,336	5	0.37
Mexico	1,845	628,614	26,596	4.23	11,216	465,339	58,905	12.66	3.46	1,093,953	85,501	7.82
Nicaragua	153	94,971	2,307	2.43	3,320	356,972	13,395	3.75	8.96	451,943	15,702	3.47
Panama	285	307,210	92	0.03	168	65,862	33	0.05	32.67	373,072	125	0.03
Paraguay	...	60,833	298	0.49	4,134	46,829	256	0.55	0.94	107,662	554	0.51
Peru b)	...	123,539	12,076	9.78	601	90,674	20,545	22.66	12.57	214,213	32,621	15.23
Puerto Rico	-	-	-	-	-	2	2	-	-	2	2	100.00
Suriname	64	23,982	971	4.05	105	42,627	2,878	6.75	33.83	66,609	3,849	5.78
Trinidad y Tabago		3,062	0	0.00	-	3,273	6	0.18	-	6,335	6	0.09
United States	-	-	-	-	-	792	792	-	-	792	792	100.00
Venezuela c	486	61,163	2,602	4.25	406	180,335	8,525	4.73	37.01	241,498	11,127	4.61
T o t a l	-	4,296,211	177,116	4.12	-	5,097,150	733,779	14.40	-	9,422,827	914,171	9.70

a) Information up to September. b) Information up to October. c) Information up to November

Table 13

INSECTICIDES USED IN THE MALARIA PROGRAMS, 1984 AND ESTIMATED 1985

Pais	D D T (Kg)				DDT (Liters)		Propoxur 50% (Kg.)		Fenitrothion 40% (Kg.)		O t h e r	
	1984	1985			1984	1985 (Est.)	1984	1985 (Est.)	1984	1985 (Est.)	1984	1985 (Est.)
	100%	100%	100%	75%								
Argentina	211	3,137	...	10,000	-	-	-	-	-	-	-	-
Belize	8,000	16,000	-	-	-	-	-	-	-	-	-	-
Bolivia	-	38,058	...	...	-	-	-	-	-	-	-	-
Brazil	89,733	1,201,349	201,000	1,920,000	13,420	35,000	-	-	-	-	-	-
Colombia	1,387	240,735	18,000	550,000	-	-	-	-	-	7,000	-	-
Costa Rica	975	4,609	1,000	5,000	-	-	149	2,500		-	1,765 a)	18,000
Dominican Rep.	362	32,680	12,000	67,000	-	-	-	-	-	-	-	-
Ecuador	1,075	138,923	5,000	150,000	-	-	-	-	47,166	100,000	193 b)	7,500 a)
El Salvador	-	-	-	-	-	-	63,919	65,000	-	-	-	-
French Guiana	780	470	800	500	15,000	15,000	-	-	1,500	500	3,000 c)	3,000 c)
Guatemala	-	-	-	-	-	-	-	-	47,034	300,000	34,521 c)	58,000 c)
Guyana	-	318	-	8,000	468	3,000	-	-	-	-	-	-
Haiti	-	-	-	-	-	-	-	-	146,953	200,000	-	-
Honduras	-	1,736	...	...	-	-	5,646	...	140,510	320,000	25,984 d)	40,000 e)
Mexico	3,098	203,411	11,000	236,075	-	-	-	47,500	-	-	3,357 f)	192,665 f)
Nicaragua	-	32,131	-	35,000	-	-	-	59,477	-	-	53,366 g)	55,000 g)
Panama	1,012	17,128	51,000	227,000	30,797	-	9,451	210,000	364	4,500	-	-
Paraguay	38,625	41,125	-	-	-	-	-	-	-	-	-	-
Peru	-	160,407	-	600,000	-	-	-	-	8,000	8,000	10,000 h)	10,000 h)
Suriname	570	1,451	1,500	1,500	-	-	-	-	-	-	-	-
Venezuela	-	120,500	718	215,930	48,725	100,211	-	-	1,926	150,000	25,589 i)	34,888 j)
T O T A L	145,828	2,254,168	302,018	4,026,005	108,410	153,211	79,165	384,477	393,453	1,090,000	157,775	419,053

a) Includes 1,439 Kg. and 326 liters of Malathion. b) Malathion Kg. c) Deltamethrin and Cyflothrin of Fenthion in 1985. g) Includes Deltamethrin and Chlorphoxim. h) Liters of Fenitrothion ULV.

Table 14

SPRAYINGS WITH RESIDUAL INSECTICIDES APPLIED IN 1983 AND 1984, IN THE MALARIA PROGRAMS OF THE AMERICAS

Country	Sprayings applied in 1983				Sprayings applied in 1984			
	DDT	PROPOXUR	FENITROTHION	OTHER	DDT	PROPOXUR	FENITROTHION	OTHER
Argentina	8,057	-	-	-	6,199	-	-	-
Belize	8,046	-	-	-	28,228	-	-	-
Bolivia	89,551 a)	-	-	-	56,869	-	-	-
Brazil	1,900,883	-	-	-	1,888,740	-	-	-
Colombia	378,055 b)	1,988	-	-	429,845	-	-	-
Costa Rica	13,592	563	-	-	12,484	247	-	2,263 c)
Dominican Republic	37,048	-	-	-	113,713	-	-	-
Ecuador	11,592	-	48,234	40,404 c)	202,415	-	47,262	16,391 d)
El Salvador	...	...	...	...	-	68,795	-	-
French Guiana	...	...	...	...	6,240	-	-	-
Guatemala	4,539	-	543,614	147,780 e)	-	-	46,924	23,095 f)
Guyana	5,777	-	-	-	1,257	-	-	-
Haiti	-	-	253,177	-	-	-	293,714	-
Honduras	61,544	-	182,125	-	2,784	-	135,390	-
Mexico	613,267	-	-	-	338,538	-	-	-
Nicaragua	28,402	-	-	27,869 g)	64,262	-	-	143,118 g)
Panama	47,937	11,391	-	-	45,597	9,930	989	-
Paraguay	45,656	-	-	-	63,486	-	-	-
Peru	95,441	-	-	-	269,129	-	-	-
Suriname	98,761	-	-	-	15,724	-	-	-
Venezuela	180,940	-	-	-	179,645 h)	-	-	5,832 i)
T O T A L	3,629,088	13,942	1,027,150	216,053	3,725,155	78,972	524,279	190,699

a) Sprayings up to November. b) Includes sprayings with DDT, Malathion, Propoxur, Fenitrothion and Carbaryl. c) Malathion. d) DDT, Fenitrothion and Malathion. e) Sprayings with Deltamethrin and Chlorphoxim. f) Deltamethrin. g) Chlorphoxim and Deltamethrin. h) Sprayings up to September. i) DDT and Dieldrin.

Table 15

INTRADOMICILIARY SPRAYINGS WITH RESIDUAL INSECTICIDES
APPLIED IN 21 COUNTRIES

Insecticide	1981		1982		1983		1984	
	Number of countries	Sprayings	Number of countries	Sprayings	Number of countries	Sprayings	Number of countries	Sprayings
DDT	19	7,525,457	19	4,541,133	18	3,629,088	18	3,725,155
FENITROTHION	3	388,223	5	810,753	5	1,027,150	6	524,279
PROPOXUR	4	62,605	6	85,848	4	13,942	3	78,972
CHLORPHOXIM	1	109,301	2	135,721	2	52,863	1	103,500
MALATHION	2	25,075	-	-	2	40,404	1	2,263
CARBARYL2	2	12,973	1	...	1	...	-	-
DELTAMETHRINE	1	16,549	1	16,717	1	...	2	62,713
HCH	1	16,549	1	16,717	-	-	-	-
DIELDRIN	-	-	-	-	-	-	1	2,916
T O T A L	-	8,156,732	-	5,606,889	-	4,763,447	-	4,499,798

... No information available.

Table 16

ANTIMALARIAL DRUGS USED IN THE MALARIA PROGRAMS IN 1984 AND ESTIMATED FOR 1985

Country	Chloroquine 150 mg		Primaquine 15 mg.		Primaquine 05 mg		Chloroquine/Primaquine combined Adult dose		Chloroquine/Primaquine combined Infant dose		Pyrimethamine 25 mg		Other
	1984	1985 a)	1984	1985 a)	1984	1985 a)	1984	1985 a)	1984	1985 a)	1984	1985 a)	1984
Argentina	9.0	10.0	4.8	5.0	2.8	5.0	-	-	-	-	-	-	-
Belize	145.0	...	30.0	...	53.0	...	-	-	-	-	-	-	-
Bolivia	614.1	1,400.0	222.2	...	101.1	...	-	-	-	-	-	-	-
Brazil	12,900.0 b)	11,000.0 b)	3,000.2	3,000.2	550.0	900.0	830.0	600.0	350.0	250.0	-	-	793.0 c)
Colombia	1,753.0 b)	2,000.0 b)	407.5	1,000.0	51.0	60.0	802.0	1,000.0	-	-	35.0	150.0	287.1 d)
Costa Rica	691.6	1,000.0	40.5	125.0	36.5	50.0	213.7	350.0	77.1	100.0	-	-	- -
Dominican Rep.	1,556.0	1,250.0	154.0	250.0	1.0	50.0	177.0	500.0	-	250.0	-	-	-
Ecuador	987.0 b)	1,203.0 b)	312.4	208.0	227.1	180.0	127.0	274.0	13.0	27.0	6.0	5.0	39.2 e)
El Salvador	1,033.7	1,000.0	668.6	700.0	386.2	400.0	2,813.7	3,000.0	1,231.7	1,500.0	-	-	-
French Guiana	10.0 f)	...	0.5	...	30.0	...	-	-	-	-	-	-	130.0 f)
Guatemala	2,290.7	3,500.0	478.5	900.0	182.6	600.0	88.8	116.0	97.2	50.0	-	-	-
Guyana	70.0	115.0 b)	23.0	65.0	11.2	60.0	19.7	...	11.0	...	35.1	35.0	28.8 g)
Haiti	3,917.4	3,119.3	50.9	...	-	-	-	6,238.5	-	3,119.3	-	-	-
Honduras	3,227.8	4,000.0	1,595.8	1,000.0	1,115.2	900.0	1,934.5	600.0	79.3	100.0	-	-	-
Mexico	6,582.2	8,300.0	903.0	820.0	1,504.8	1,400.0	2,839.0	3,649.0	497.0	670.0	-	-	-
Nicaragua	5,422.0	5,000.0	1,327.9	1,500.0	591.2	1,000.0	-	-	-	-	-	-	-
Panama	418.0 b)	292.6 b)	34.0	23.8	11.0	7.7	142.0	99.4	33.0	23.1	2.0	1.4	1.1 h)
Paraguay	600.0	1,500.0	30.0	70.0	8.0	20.0	-	100.0	-	20.0	-	-	-
Peru	324.0	3,000.0 b)	299.0	600.0	101.0	200.0	-	-	-	-	-	1.0	0.9 h)
Suriname	263.5 b)	200.0 b)	40.0	30.0	19.0	20.0	-	-	-	-	16.5	-	39.8 i)
Venezuela	2,069.0	2,750.0	436.0	275.0	73.0	66.0	534.0	1,375.0	830.0	220.0	27.0	82.5	4.6 j)
T O T A L	44,884.0	50,639.9	10,058.8	10,572.0	5,055.7	5,918.7	10,521.4	17,901.9	3,219.3	6,329.4	121.6	274.9	1,324.5

a) Estimated. b) Includes Chloroquine and Amodiaquine 150 mg. c) Includes in 1984, 388,000 Fansidar Tabs. and 395,000 Quinine sulphate Tabs. and in 1985, 350,000 Tabs. and 300,000 respectively. d) Includes Fansidar, Camoprime Tabs. and they will also used Quinine injections.
e) Includes Fanasil and Fansidar Tabs. f) Amodiquine Tabs. g) Fansidar, Fanasil and Daraclor. h) Fanasil. i) Fansidar, Daraclor and Paludrine.
j) Fansidar and Quinine sulphate.

Table 17

ANTIMALARIAL DRUGS USED IN 21 COUNTRIES OF THE AMERICAS
1980-1984

DRUGS		QUANTITIES				
		1980	1981	1982	1983	1984
4-Aminoquinolines:						
Chloroquine 150 mg.	Tabs.	39,557,700	49,965,200	26,945,700	24,627,900	35,092,360
Amodiaquine 150 mg.	Tabs.	45,000	-	6,019,400	6,628,900	9,382,000
8-Aminoquinolines:						
Primaquine 15 mg.	Tabs.	4,962,400	7,697,600	4,623,900	7,097,300	10,058,800
Primaquine 05 mg	Tabs.	2,893,100	6,295,800	3,921,400	3,340,700	5,055,700
Chloroquine/Primaquine (150/15)	Tabs.	8,287,200	7,742,300	9,340,200	10,706,500	10,521,400
Chloroquine/Primaquine (75/7.5)	Tabs.	502,700	1,585,600	5,779,400	4,990,200	3,219,300
Pyrimethamine 25 mg.	Tabs.	1,101,300	970,000	1,617,100	650,200	121,600
Sulphadoxine 500 mg.	Tabs.	229,100	301,000	425,600	181,100	109,030
Sulphadoxine/Pyrimethamine	Tabs.	27,800	60,000	104,400	464,400	527,050
Chloroquine/Pyrimethamine	Tabs.	289,000	121,000	187,400	143,000	23,600
Amodiaquine/Primaquine	Tabs.	-	-	-	1,360,000	110,000
Paludrine	Tabs.	-	-	-	4,000	11,000
Tetracycline	Tabs.	-	-	-	-	810
Quinine - Sulphate	Tabs.	-	-	-	272,600	416,300
Quinine	Kg.	-	-	-	10	10
Quinine - Sulphate	Injections	-	-	900	-	13,800

Table 18

PERSONNEL EMPLOYED IN THE MALARIA PROGRAMS IN THE AMERICAS
1983 AND 1984 a)

Category	1983	1984
Engineers	72	65
Spraying Chiefs	440	449
Sector Chiefs	596	572
Squad Chiefs	1,459	1,507
Spraymen	7,328 b)	7,191 b)
Draftsman	89	67
Medical Officers	159	150
Entomologists	51	55
Assistant Entomologists	298	296
Statisticians & Stati. Assist	381	643
Evaluation Inspectors	2,239 b)	2,299 b)
Evaluators	8,855 b)	8,195 b)
Microscopists	1,016	1,123
Administrators	56	57
Administrative Assistants	690	478
Accountants	29	39
Disbursing Officers	45	44
Storekeepers	63	64
Storekeepers' Assistants	62	72
Secretaries	367	279
Others	606	652
Transport Chiefs, mechanics and assistant mecanics	366	307
Drivers	908	856
Motorboat operators	289	268
Boatmen	59	126
T O T A L	26,519	25,854

a) The administration of some malaria programs is under the national health services

b) In some programs this personnel performs other activities with same category.

Table 19

NATIONAL AND INTERNATIONAL CONTRIBUTIONS TO THE MALARIA PROGRAMAS OF THE AMERICAS, EXPENDITURES 1983-1984 AND BUDGET 1985

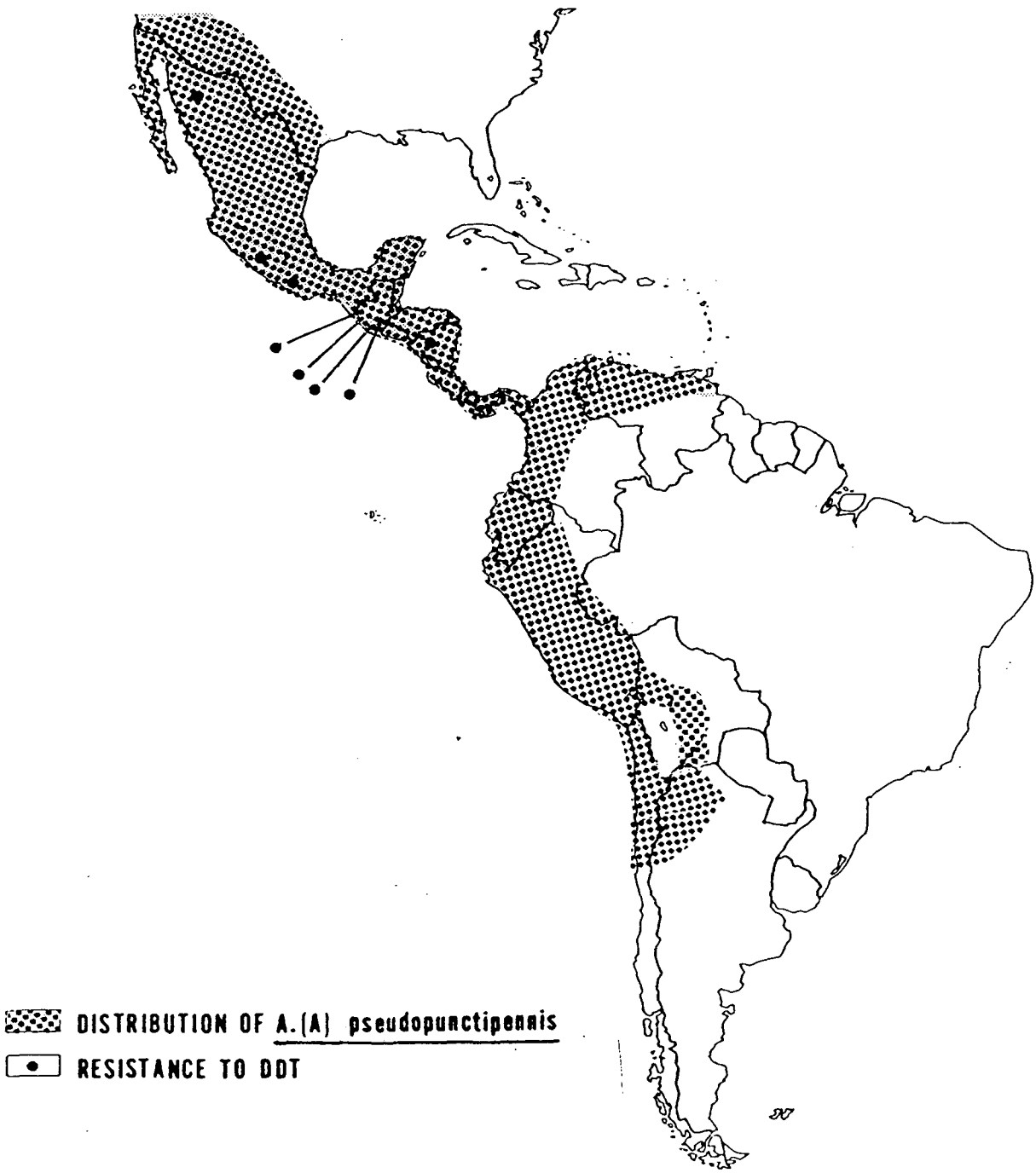
Country	National expenditures a)			PAHO/WHO Contributions			Grants and Loans			T o t a l		
	1983	1984	1985	1983	1984	1985	1983	1984	1985	1983	1984	1985
Argentina	61,470	128,368	...	7,904	-	-				69,374	128,368	0
Belize	318,787	269,379	278,052	208,314	5,550	5,550				527,101	274,929	283,602
Bolivia	306,604	20,704	39,000	75,073	63,900	63,900				381,677	84,604	102,900
Brazil	51,424,360	31,862,368	...	394,399	454,300	454,300	8,287,631	-	-	60,106,390	32,316,668	454,300
Colombia	11,828,127	8,964,488	3,981,327	328,528	299,850	299,850				12,156,655	9,264,338	4,281,177
Costa Rica	867,632	995,996	988,142	35,306	-	-				902,938	995,996	988,142
Dom. Rep.	1,086,204	1,457,155	...	29,429	35,150	35,150				1,115,633	1,492,305	35,150
Ecuador	4,109,589	3,989,637	3,989,637	88,300 c)	51,400 c)	51,400 c)	-	-	103,627	4,197,889	4,041,037	4,144,664
El Salvador	1,136,584	1,772,672	1,776,104	73,803	82,800	82,800				1,210,387	1,855,472	1,858,904
French G.	1,722,058	1,330,526	1,288,095	-	-	-				1,722,058	1,330,526	1,288,095
Guatemala	3,365,584	3,804,108	3,109,909	25,744	29,950	29,950				3,391,328	3,834,058	3,139,859
Guyana	219,333	133,333	...	63,171	33,500	33,500				282,504	166,833	33,500
Haiti	56,000	56,000	280,000	307,343	344,200	344,200	222,000	222,000	1,110,000	585,343	622,200	1,734,200
Honduras	1,985,250	1,717,500	2,409,289	49,598 c)	56,500 c)	56,500 c)	100,000	130,000	486,191	2,134,848	1,904,000	2,951,980
Mexico	16,773,636	...	...	90,214	56,950	56,950				16,863,850	56,950	56,950
Nicaragua	...	...	...	57,762	-	-				57,762	0	0
Panama	2,409,449	2,682,862	...	5,993	-	-				2,415,442	2,682,862	0
Paraguay	1,094,843	1,240,225	900,220	31,057	34,600	34,600				1,125,900	1,274,825	934,820
Peru	...	...	...	-	-	-				0	0	0
Suriname	874,576	...	...	68,168	-	-				942,744	0	0
Venezuela	14,428,176	6,861,843	10,396,051	-	-	-				14,428,176	6,861,843	10,396,051
Intercountry Projects and Headquarters				688,705	444,500	444,500				688,705	444,500	444,500
Total	114,068,262	67,287,164	29,435,826	2,628,811	1,993,150	1,993,150	8,609,631	352,000	1,699,818	125,306,704	69,632,314	33,128,794

a) Conversion to USA Dollars according to official exchange rate of each year.
b) Estimated based on Operating Budget, 1984-1985
c) Estimated

... No information available.

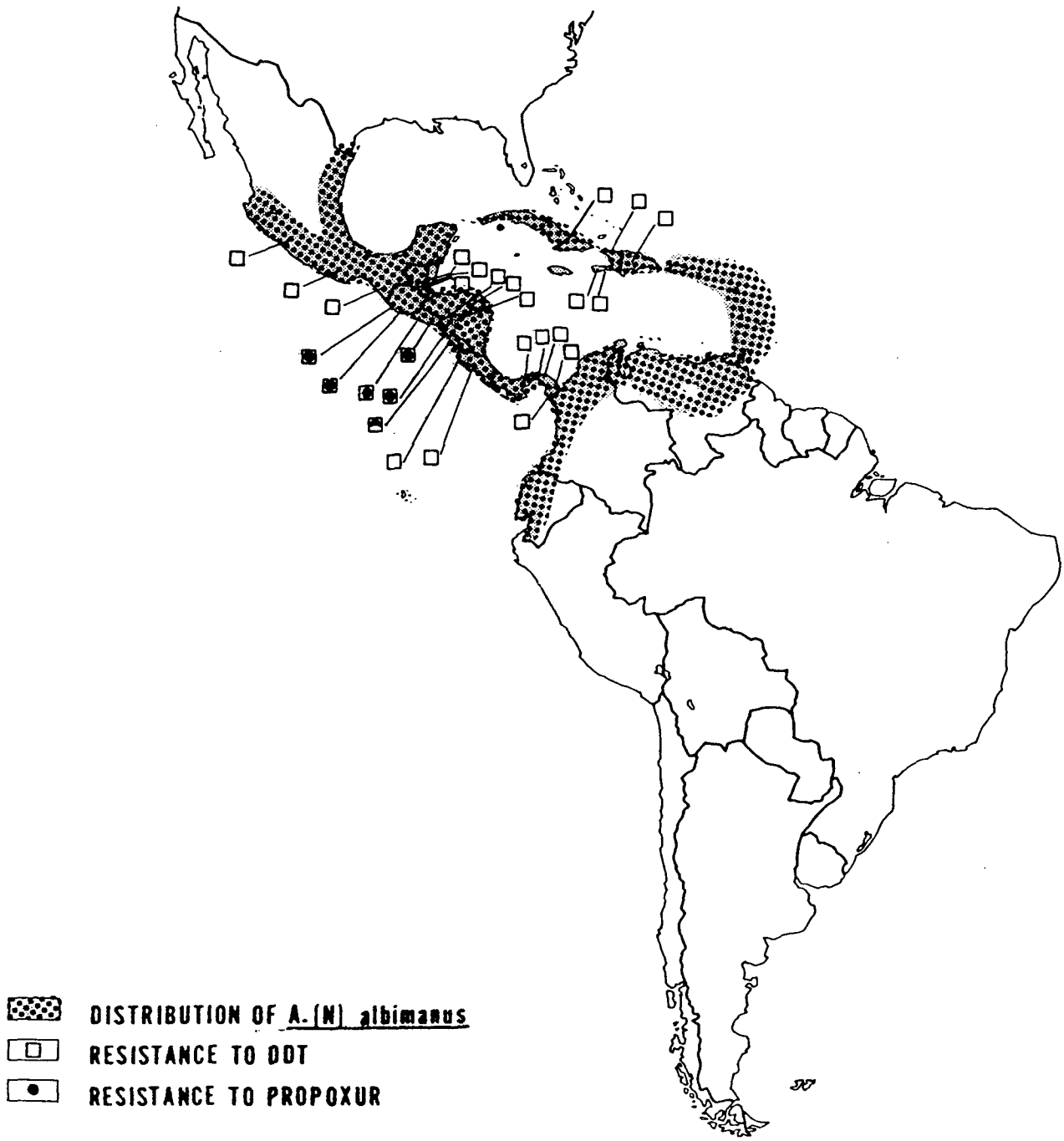
MAP 5

DISTRIBUTION OF A. (A) pseudopunctipennis AND RESISTANCE TO DDT



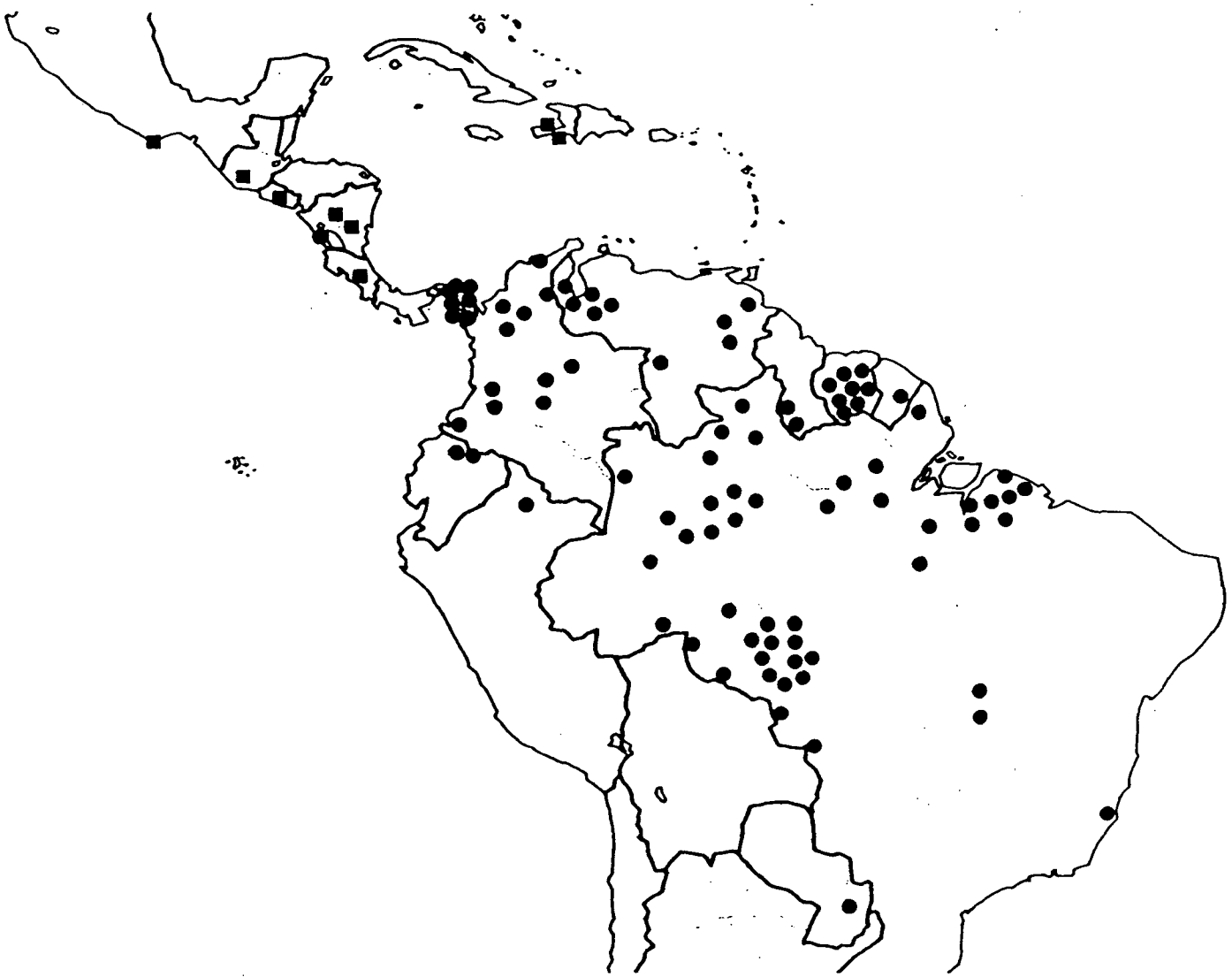
MAP 6

DISTRIBUTION OF A. (N) albimanus AND RESISTANCE TO DDT AND PROPOXUR



MAP 7

RESPONSE OF P. FALCIPARUM TO CHLOROQUINE



● RESISTANT ■ SUSCEPTIBLE

Table 20

GEOGRAPHICAL DISTRIBUTION OF AREAS WITH TECHNICAL PROBLEMS, 1984

Country and areas	Population of affected areas	Area km2	Insecticide		Number of cases	Principal vectors	Causes of the problem
			Type used	Years of coverage			
Argentina: Tartagal, Oran Iruy, Santa Victoria	68,939	11,275	DDT	26	254	A. pseudopunct.	Internal & external migrations; difficult access to affected areas; climatological and socio-economic problems; international borders
Bolivia: Beni Department Prov. Vaca Diez	56,706 a)	22,434	DDT	26	602	A. darlingi	Migrations, poor housing, insufficient insecticide coverage; P. falciparum resistance to 4 aminoquinolines
Brasil: Acre, Amapa, Amazonas, Goias, Maranhao, Mato Grosso, Para, Rondonia, Roraima	4,149,541	1,823,063	DDT	17	297,754	A. darlingi	Intense population movements; poor housing; P. falciparum resistance; high anophelic density
Colombia: Bajo Cauca (Nechi) Uraba, Litoral Pacifico Magdalena Medio, Catatumbo, Sarare, Ariari, Guejar, Vaupes, Caqueta, Putumayo, Guaviare.	1,890,276	305,659	DDT	De 18 a25	34,290	A. darlingi A. punctimacula A. nuneztovari A. albimanus A. pseudopunct. A. nelvai A. albitarsis	Vector behavior; poor housing colonization; social problems; resistance to chloroquine; refusal to sprayings; population movements
Ecuador: Esmeraldas	309,528	17,887	DDT Propoxur	15 4	22,422	A. punctimacula A. albimanus A. pseudopunct.	Operational and administrative problems; poor housing; resistance to chloroquine; lack of insecticides
El Salvador: Pacific coastal	1,610,237	4,819	Propoxur	7	53,854	A. albimanus	Vector resistance to almost all insecticides; population movements; poor housing; lack of human, material and financial resources

a) Population figure refers to 1983

Table 20 (Pag. 2)

GEOGRAPHICAL DISTRIBUTION OF AREAS WITH TECHNICAL PROBLEMS, 1984

Country and areas	Population malarious areas	Area km2	Insecticide		Number of cases	Principal vectors	Causes of problems
			Type used	Years of coverage			
Guatemala:							
Ecological zone del Pacifico	3,497,533	80,570	Delta-metrina	De 4 a 6	74,123	A. albimanus A. vestitipennis A. pseudopunct.	Interruption of activities because of socio-political problems; vector resistance; lack of insecticides
French Guiana:							
Twanke, Antecome, Maripo-soula, Grand Santi, Camopi, Trois Sauts, St. George, Ramire, Montjoly, Macouria and Montsinery	11,360	217	DDT	De 4 a 16	759	A. darlingi	Internal and external migrations
Guyana:							
Rupununi, Region Noroeste, Mazaruni/Cuyuni/Potaro	204,600	23,670	DDT	20	2,532	A. darlingi	Incomplete sprayings; population movements; difficult access to sick people
Haiti:							
No available information	...	...	...	...	...	...	...
Honduras:							
No available information	...	...	...	...	...	...	...
Mexico:							
Basins of Rivers Fuerte, Sinaloa, Humaya & Tamazula. Huicot, Basin of Balsas River; Costa Chica of Guerrero & Oaxaca coast. South border of Mexico; Central part of Chiapas	4,604,122	203,910	DDT and dieldrin	27	58,224	A. pseudopunct. A. albimanus	Internal migration; poor housing; temporary shelters; modification of houses; vector resistance to DDT; actions which removes insecticides from sprayed surfaces; funds limited high cost of materials, personnel problems

Table20 (Pag. 3)

GEOGRAPHICAL DISTRIBUTION OF AREAS WITH TECHNICAL PROBLEMS, 1984

Country and area	Population malarious areas	Area km2	Insecticides		Number of cases	Principal vectors	Causes of the problem
			Type used	Years of coverage			
Nicaragua:							
Departments of Chinandega, Leon, Managua, Granada and Rivas	3,165,100	118,958	DDT Mal. Deltam.	24 5 4	15,702	A. albimanus	Vector resistance to DDT, to malathion and propoxur
Panama:							
Bocas del Toro; Puerto Pina, Tobobe, Puerto Obadia, Tucuti, San Blas	17,673	6,326	DDT Prop. Mal.	27 De 1-10 2	146	A. albimanus	Migration; poor housing; population movements
Paraguay:							
Special areas	245,122	20,000	DDT	16	241	A. darlingi	Residual foci; population movements; construction of lakes and hydroelectric dams
Dominican Republic:							
No information	...	...	...	...	...	...	...
Peru:							
Colon. San Lorenzo; Bigote, Chinchipe, Bagua Santiago, Ene-Satipo, Bajo Maranon Pucalpa	248,527	143,350	DDT	20-25	11,403	A. albimanus A. pseudopunct. A. rangeli A. benarrochi	High vulnerability; poor housing; migration of laborers; temporary shelters; aggresions to sprayed surfaces; insufficient coverage
Venezuela:							
Western and Southern areas	719,990	139,603	DDT	37	...	A. nuneztovari	Vector exophily; population movements; anthropological problems
T o t a l	29,819,256	2,921,661	-	-	571,508	-	-

Note: In the Americas there are also regions with all types of problems with special characteristics, such as the Amazon basin which includes areas of Bolivia, Colombia, Peru and large extension of Brazil; in the latter country, for example, a large scale plan for socio-economic development which contemplates construction of unlimited number of highways and projects of colonization makes it necessary that anti-malarial campaign be carried out as long-term program.

Table 21

PERSONNEL TRAINING FROM THE NATIONAL MALARIA SERVICES
DURING 1984

Country	Number of persons trained	Course and Whorshop
Argentina	9	Course on epidemiology and diagnosis laboratory for biochemisters
Belice	32	Worshop for spraymen
	39	Worshop for evaluators
Bolivia	180	Retraining course for spraymen
	94	Retraining course for evaluators
Brasil	22	Advanced course on epidemiology and control (for high level personnel)
	10	Course for entomology aids
Costa Rica	45	Course for spraymen
Ecuador	8	Course on malaria diagnosis
	10	Course for sector chiefs
El Salvador	10	Course for health educators
	21	Course for sector and field chiefs
	35	Course for entomology aids
Guyana	4	Retraining course for microscopists
Haiti	11	Course for health educators
	36	Course for entomology aids
	360	Course on spraying training
	103	Workshop on malaria for medical and paramedical personnel

Table 21 (page 2)

PERSONNEL TRAINING FROM THE NATIONAL MALARIA SERVICES
DURING 1984

Country	Number of persons trained	Course and whorshop
Honduras	30	Course on epidemiology for entomology and epidemiology aids
	32	Course on larva control for brigade chiefs and supervisors
	21	Course on administration for supervisors
	32	Course on pesticides risks
Nicaragua	12	Course on applied malaria statistics
Panama	9	Course on applied entomology to malaria
	10	Course on susceptibility of P. falciparum to antimalarial drugs
Paraguay	367	Four refreshing workshops for professional technical and auxiliary personnel
Dominican Republic	23	Course on hematozoary diagnosy
Suriname	25	Advanced course on epidemiology and control of malaria
Venezuela	14	Several courses on diagnosis of malaria, chagas and intestinal parasites