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STATUS OF MALARIA PROGRAMS IN THE AMERICAS

XXV REPORT

TABLE OF CONTENTS

GRAPHS, MAPS AND TABLES

Tables (Cont.) Page

XXV REPORT ON THE STATUS OF THE MALARIA PROGRAM IN THE AMERICAS, 1976

Introduction

The Director of the Pan American Sanitary Bureau has the honor to present to the Directing Council at its XXV Meeting the XXV Report on the malaria program in the Americas, in 1976.

In Resolution XXII of its XXIII Meeting in October 1975, the Directing Council of the Pan American Health Organization expressed concern at the deterioration of the malaria situation in the Americas, requested the application of a flexible methodology better adapted to the actual epidemiological and economic conditions in each country, and that priority be given to personnel training and research.

In compliance with this Resolution the Pan American Sanitary Bureau carried out the following activities:

a) Headquarters staff visited the great majority of the malaria programs in the Region to hold interviews with the health authorities and those in charge of the specific programs of the several countries for a joint study of the epidemiological and operational basis of the recommended changes;

b) The Bureau prepared and distributed the document "Orientations on the Future Development of the Malaria Program in the Americas," which several countries adapted to local conditions. This document was distributed among the technical and auxiliary field staff and on many occasions was used for reference in national meetings and in the preparation of plans of operation. All the countries with malaria programs have advised PAHO/WHO of the wide use given to this document;

c) At the request of their respective governments, PAHO/WHO made special evaluations of the malaria program in Brazil, Ecuador, Haiti, Nicaragua and Paraguay;

d) An international refresher seminar for engineers in mosquito control was held with financial assistance from US/AID;

e) The Bureau collaborated with the School of Public Health of Mexico in conducting the first course towards the degree of Master of Public Health with emphasis on malaria and other parasitic diseases, and with the School of Public Health of São Paulo, Brazil, on the International Course in Epidemiological Entomology for graduate students. These two courses will be held again in 1977;

f) In collaboration with the Government of Colombia and the University of New Mexico, USA, and with a US/AID grant, a Malaria Immunology Research Project was organized and set up in Bogotá.

In the Americas, the rigid criteria of the traditional methodologies of malaria programs are evolving towards operational flexibility on a sounder epidemiological, socioeconomic, health and resource basis in each country. Several countries have drawn up plans of operation based on an improved epidemiological knowledge in their application of combined methods and selective use of insecticide spraying.

The malaria situation in the Americas, while improving in some areas, has worsened considerably in others because of technical and financial problems aggravated by the world inflation and the restrictions on the use of insecticides. In 1976, 71.0 per cent of the inhabitants of originally malarious areas were living in areas of consolidation and maintenance, though the slide positivity rate of 4.1 per cent recorded for the year was the highest since 1958. This rise was caused chiefly by the persistence of transmission in certain areas.

A total of US$995,050,825 has been invested in malaria programs in the Americas since 1957. Of this amount, 80.8 per cent was put up by national governments and 19.2 per cent by international aid sources.

Malaria activities in PAHO/WHO are part of the new Program of Malaria and Other Parasitic Diseases in the Division of Disease Control.

I. STATUS OF MALARIA PROGRAMS

A. General Information

The estimated population of the Americas in December 1976 was 565,249,000 persons, of which 211,086,000 (37.3 per cent) resided in originally malarious areas. Of the latter figure, 101,086,000 (47.9 per cent) lived in areas in which malaria had been eradicated (maintenance phase), 48,813,000 (23.1 per cent) in areas in which malaria transmission had been interrupted (consolidation phase) and 61,205,000 (29 per cent) in areas of continuing transmission (attack phase). Compared with the status at 31 December 1975, there was a net increase of the population living in the maintenance and consolidation areas from 70.0 per cent in 1975 to 71.0 per cent in 1976. In Panamá, 13,474 km^2 with 901,000 inhabitants were transferred from the attack to the consolidation phase.

Table 1 shows the population of malarious areas in the Americas by phases and years since 1958, and Tables 2 and 3 the population and areas in square kilometers by countries and phases of the program. Maps 1 and 2 convey the geographical extent of the areas in the various phases of the program in December 1975 and 1976.

During 1976 a total of 9,351,875 blood slides were examined, of which 379,336 were found positive for malaria parasites, giving an annual blood examination rate (ABER) of 4.43 per cent and an annual parasite incidence (API) of 1.80 per 1,000 inhabitants. Table 4 summarizes the number of slides examined, positives, and the morbidity from malaria since 1958. Table 5 gives the results of blood slide examinations during 1976 by countries and phases of the program. The results of the examinations, the number of positives found, the parasite species and the classification of cases in each phase of the program are provided in Tables 6, 7, 8 and 9.

On the basis of the situation in 1976, the malaria programs of the Region may be classified in two groups.

Group I encompasses 12 political units (countries or territories) in which malaria eradication has been certified for the whole of the country: Chile, Cuba, Dominica, the United States of America, including the Virgin Islands and Puerto Rico, Grenada and Carriacou, Guadeloupe, Jamaica, Martinique, St. Lucia, and Trinidad and Tobago. This group has a population of 71,236,000 persons living in originally malarious areas, or 33.8 per cent of the total population of the originally malarious area in the Hemisphere. During 1976, 424 cases of imported malaria, which did not cause local transmission, were recorded in seven of these political units.

Group II includes 21 political units in which malaria control programs were in progress. On the basis of the epidemiological situation in 1976, the group has been divided into two areas as follows:

GROUP II

Country	AREA A Consolidation and maintenance (with imported cases or limited foci)			AREA B Attack (with and without control measures)		
	Population (thousands)	Cases	API	Population (thousands)	Cases	API
Argentina	3 033	9	0.003	70	61	0.87
Belize	109	156	1.43	27	43	1.59
Bolivia	1 089	928	0.85	741	5 786	7.81
Brazil	25 244	2 179	0.09	19 125	87 780	4.59
Colombia	10 168	4 566	0.45	4 775	34 456	7.22
Costa Rica	500	149	0.30	164	324	1.98
Dominican Republic	4 718	354	0.08	86	232	2.70
Ecuador	1 811	1 128	0.62	2 460	9 846	4.00
El Salvador	-	-	-	3 625	83 290	22.98
French Guiana	50	252	5.04	5	142	28.40
Guatemala	-	-	-	2 405	9 616	4.00
Guyana	799	122	0.15	37	4 520	122.16
Haiti	-	-	-	4 025	15 087	3.75
Honduras	475	670	1.41	2 108	48 134	22.83
Mexico	15 125	522	0.03	15 931	17 631	1.11
Nicaragua	-	-	-	2 300	26 228	11.40
Panama	1 353	60	0.04	302	667	2.21
Canal Zone	45	7	0.16	-	-	-
Paraguay	1 285	0	-	994	140	0.14
Peru	3 891	4 630	1.19	1 443	13 832	9.59
Surinam	236	49	0.21	32	488	15.25
Venezuela	8 714	739	0.08	550	4 001	7.27
Total	78 645	16 520	0.21	61 205	362 304	5.92

In Area A there were 16,520 recorded cases, of which 4,211 were autochthonous. In general, this area is subject to constant importation of cases from Area B, and transmission is observed in residual or new foci originated from imported cases. In most of the countries the foci are effectively eliminated by emergency measures. In the last three years, however, a deterioration has been observed in the epidemiological situation of Belize, Bolivia, Costa Rica, Ecuador, Panamá and Perú. In Guyana, part of Area A was transferred to Area B because of an extensive transmission that could not be checked by emergency focal measures. The autochthonous cases in this area during recent years were as follows:

	1974	1975	1976
Recorded cases	11 162	15 852	16 520
Autochthonous cases	2 997	4 606	4 211
%	26.9	29.1	25.5

Area B has a population of 61,205,000 inhabitants, or 29.0 per cent of the total for all malarious areas in the Hemisphere, but they account for 362,304 cases of malaria, which is 95.5 per cent of the 379,248 cases recorded in 1976. Adding the cases exported to Area A would raise this proportion to 99 per cent.

In the last three years there was a deterioration in the epidemiological situation of the Region, and the causes are analyzed in chapter II of this report. In overall figures, the API rose from 1.3 in 1974 to 1.7 in 1975 and 1.8 in 1976. The areas of persistent transmission in Area B are responsible for this increase, as shown in the following table:

Annual Parasite Incidence, number of malaria cases and Percentage of the population by groups

	API			Malaria Cases			% of population of malarious area		
	1974	1975	1976	1974	1975	1976	1974	1975	1976
Group I	0.004	0.01	0.01	301	435	424	34.5	34.2	33.7
Group II									
Area A	0.2	0.2	0.2	11 162	15 852	16 520	34.1	35.8	37.3
Area B	4.1	5.5	5.9	257 540	340 355	362 304	31.4	30.0	29.0
Total	1.3	1.7	1.8	269 003	356 642	379 248	100.0	100.0	100.0

B. Country information

ARGENTINA - Malaria cases: 1974=171 1975=100 1976=70

Antimalarial work continued with intensified case detection through hospitals, voluntary collaborators and the staff of the Malaria Service. Two DDT spraying cycles were carried out in the northern border area and all cases were investigated and treated. Of the 70 recorded cases only 26 were autochthonous, showing a marked reduction in transmission.

BELIZE - Malaria cases: 1974=96 1975=90 1976=199

The number of supervisory and field staff decreased; antimarial work declined and migrant farmhands came in from neighboring countries where there was transmission, which increased the numbers of imported and authochthonous cases. An epidemic outbreak at the end of the year in Corozal district produced 81 cases, and emergency spraying was done in 14 localities to control it.

BOLIVIA - Malaria cases: 1974=4,936 1975=6,615 1976=6,714

Operations were hampered by administrative and financial factors, which compelled a curtailment of programmed activities. The incidence rose in the departments of Beni, Pando, Chuquisaca and Tarija, and areas in which transmission had been interrupted were reinfected. At the beginning of the year DDT spraying was confined to localities where the incidence of malaria was high. With the arrival of fresh DDT supplies at mid-year, the coverage of spraying was extended in the second cycle.

BRAZIL - Malaria cases: 1974=66,481 1975=88,630 1976=89,959

In the short-term eradication area malaria continued to respond to the measures being applied, and foci of transmission became fewer and less intense. Of the 35,039,000 people living in the area, only 5,483,000 were protected by DDT sprayings, and the rest were under epidemiological surveillance, as transmission had been interrupted.

In the long-term eradication area (Amazonian Region), with a population of 9,330,000 inhabitants, there are two types of epidemiological situation: one being of a stable and isolated population where transmission has been interrupted or can be interrupted by conventional measures (DDT and drugs), and the other of a new group of population with constant movement and poor housing conditions in areas where large-scale agricultural projects are in progress, hydroelectric plants are being built, and highways are being laid. Where these conditions exist, conventional measures are not sufficiently effective, and other methods are under study to replace or complement those now in use.

In the short-term eradication area 1,786,280 blood smears were examined and 6,868 found positive, with an API of 0.2 per 1,000 inhabitants. In the long-term eradication area, a total of 742,352 blood smears were examined with 80,880 cases (an API of 8.7 per 1,000 inhabitants). In non-malarious areas 74,880 blood slides

were examined and 2,211 cases detected. At the request of the Government, national and PAHO/WHO technical staff evaluated the short-term eradication area and recommended the transfer of areas from attack to consolidation phase and from consolidation to maintenance phase as from 1 January 1977.

COLOMBIA - Malaria cases: 1974=22,406 1975=32,690 1976-39,022

Scant progress has been made, largely because of technical and financial difficulties. The main technical problems derive from the exophily of A. nuñeztovari in the eastern and northern regions of the country, intense land settlement, and very widespread resistance of P. falciparum to chloroquine. A detailed study is now in progress to delimit the areas of transmission more accurately and decide on the measures to apply. The results of these studies are expected to help reduce insecticide applications in a considerable number of localities.

COSTA RICA - Malaria cases: 1974=152 1975=290 1976=473

Much of the country has remained free of transmission despite a considerable increase in the number of imported cases. Of 473 recorded cases, 180 were classified as imported. In Corredores canton a small malaria outbreak was observed which was overcome by the end of the year with emergency measures that included the application of propoxur and the distribution of antimalarial drugs in the affected localities.

DOMINICAN REPUBLIC - Malaria cases: 1974=520 1975=159 1976=586

The program has been conducted efficiently, but is still contending with the serious problem of imported malaria cases. An epidemiological vigilance system has been set up to prevent a resumption of transmission, but despite these measures an outbreak of 200 cases was discovered in July which was controlled by the end of the year with DDT sprayings, the administration of antimalarial drugs, the cleaning of channels and distribution of larvivorous fish. In the locality of Pedernales, on the border, larvivorous fish were planted in all mosquito breeding grounds with good results.

ECUADOR - Malaria cases: 1974=5,481 1975=6,555 1976=10,974

Following resumption of DDT spraying in 1969, the number of cases fell from 50,957 in 1969 to 5,481 in 1974, but transmission persisted in the last two years, chiefly in the two northern provinces, Esmeraldas and Napo, which contained 7 per cent of the total population of the malarious-area and accounted for 70 per cent of the cases recorded in the country in 1976. Migrations and makeshift housing in land-settlement areas have contributed to the persistence of transmission in these two provinces. At the request of the Government, a group of national, PAHO/WHO, US/AID and US/CDC technical staff evaluated the program and recommended the application of combined control measures.

EL SALVADOR - Malaria cases: 1974=66,691 1975=83,100 1976=83,290

The malaria situation has deteriorated since 1974, chiefly because of an increase in the intensity and area of vector resistance to DDT and propoxur. Antimalarial drugs were distributed selectively to populations along the Pacific Coast, where the use of insecticides was suspended. Five localities were selected for the application of antilarval measures, but the plan was carried out only in part. The second part of the International Seminar on Mosquito Control was held in July and attended by engineers from the malaria programs of 14 countries.

FRENCH GUIANA - Malaria cases: 1974=351 1975=319 1976=394

Since 1973 malaria transmission has been held in check by insecticide sprayings, the collective distribution of drugs in selected localities, radically curative treatment of all cases, and distribution of chloroquine to the inhabitants of areas of high receptivity and vulnerability. Small outbreaks were observed in consolidation and maintenance areas, but were brought under control with emergency measures. In the hinterland, which is in the attack phase, DDT spraying in six-month cycles was continued.

GUATEMALA - Malaria cases: 1974=4,030 1975=4,979 1976=9,616

The malaria situation worsened considerably in the second half of the year chiefly because of increased vector resistance to insecticides. A study was begun to delimit more accurately the foci of transmission and to select replacement or complentary measures that could help interrupt transmission.

GUYANA - Malaria cases: 1974=72 1975=1,197 1976=4,642

In 1974 and 1975 antimalarial activities were suspended almost entirely because of financial difficulties. The malaria situation began to deteriorate in 1975 in the Rupununi region, and transmission then spread to the Northwest region in early 1976 and to the New River Triangle in October 1976.

Because of the gravity of the epidemic outbreaks, in February 1976 the Minister of Health declared the problem as a national emergency and an interministerial meeting was held in March to arrive at an emergency plan. Additional field and laboratory staff were hired, and antimalaria activities were resumed in May.

The Third Border Meeting of the NMESs of Brazil, French Guiana, Guyana, Surinam and Venezuela was held from 18 to 20 October in Georgetown.

HAITI - Malaria cases: 1974=25,441 1975=24,733 1976=15,087

A sanitation Unit was set up in the NMES to program and carry out antilarval measures in the principal foci of transmission. Drainage, land-fill, and stream diversion projects were carried out to eliminate or reduce breeding places at Cité Simone O. Duvalier, Petit Goâve, Jacmel, Anse-à-Pitre, Les Cayes, Passe-Reine and Môle Saint Nicolas. In Artibonite Valley intermittent irrigation was experimented as a means of controlling mosquitoes in rice fields, and a preliminary report pointed to encouraging results. At the request of the Government, the program was evaluated by local and PAHO/WHO personnel. A five-year plan was elaborated, to be executed with US/AID financial assistance and calling for combined-method operations that have already been started. The malaria situation in the country was more favorable in 1976 than in the previous year.

HONDURAS - Malaria cases: 1974=7,503 1975=30,289 1976=48,804

Difficulties in obtaining needed funds and insecticides continued to plague the program. During the first six months most of the inhabitants of the malarious area were without protection. Spraying was begun in July with propoxur donated by the European Economic Community, but coverage was incomplete. At the end of the year the operations were being carried out as programmed.

MEXICO - Malaria cases: 1974=26,800 1975=27,925 1976=18,153

Reductions in the number of cases were observed in most areas. Transmission has been interrupted in much of the region of the Gulf of Mexico and Yucatán Península, where spraying has been suspended, but current administrative regulations prevented the transfer of personnel to other regions. Transmission is confined to small areas of new land settlements. The program gives priority to operations on the Pacific Slope. In October the situation was reviewed in a meeting of the technical staff of the program to determine future strategy for better utilization of the available resources and the application of more effective measures suited to local epidemiological conditions.

NICARAGUA - Malaria cases: 1974=12,167 1975=24,692 1976=26,228

Considerably less use of propoxur was made on the Pacific Coast because of increased vector resistance to this insecticide. DDT spraying in the Caribbean area was reduced in the first cycle for lack of insecticide. Following the recommendations of an Evaluation Committee of national and PAHO/WHO technical staff (1975), antilarval activities were begun in the four principal foci - Managua, Ingenio San Antonio, Ingenio Montelimar and Tipitapa. Very good results were observed in these

foci in the second half of the year after these measures had been taken. The financial cooperation and materials donated by the municipal authorities and the owners of the sugar plantations were particularly noteworthy.

PANAMA - Malaria cases: 1974=1,184 1975=666 1976=727

At the request of the Government, a group of national and PAHO/WHO technical personnel evaluated the program in May and recommended the transfer of 13,474 km^2 with 901,000 inhabitants from the attack to the consolidation phase. Transmission is focalized in a few localities of Bocas del Toro, Darién and Panamá provinces, and the NMES is concentrating its efforts to eliminate these foci. The Government gives high priority to the program and is assigning the needed resources to it.

PARAGUAY - Malaria cases: 1974=101 1975=217 1976=140

The incidence of malaria has held low in recent years, but there is a potential danger springing from the migrations and new land settlements associated with construction of the Itaipú dam. At the request of the Government, national and PAHO/WHO personnel evaluated the program in December and recommended the transfer of areas in attack phase to consolidation phase, and of areas in consolidation to that of maintenance as from January 1977. This transfer would place 56.4 per cent of the population in the malarious area in the consolidation and maintenance phases.

PERU - Malaria cases: 1974=12,485 1975=14,338 1976=18,462

The epidemiological situation in the consolidation areas has deteriorated, particularly in the northern part of the country where areas under irrigation are being considerably extended. The maintenance areas continue free of transmission. The program has been beset by financial problems. The vectors are still susceptible to DDT. In late 1976 a meeting of national personnel of central and field-levels was held in Chiclayo to analyze the epidemiological situation in small areas and provide guidelines for future strategy.

SURINAM - Malaria cases: 1974=3,984 1975=2,741 1976=537

There was a very substantial improvement in the malaria situation in 1976 and the number of cases was the lowest on record since 1958. Cases of chloroquine-resistant P. falciparum were discovered but they apparently have had no epidemiological repercussions. Transmission is localized chiefly along the Tapanahony River and at isolated settlements on the Brazilian border.

VENEZUELA - Malaria cases: 1974=7,648 1975=5,952 1976=4,740

Ninety four per cent of the original malarious area is still in the maintenance phase, and only 6 per cent is in the attack phase. In the latter areas the incidence is still dropping slowly. Transmission is due mainly to the exophily of A. nuñeztovari and to problems associated with the human ecology and the difficulties of access to some areas.

C. Field operations

The use of residual insecticides in intradomiciliary spraying remained the principal method for interrupting malaria transmission in the Region; in the 21 countries and territories where there was transmission, DDT was applied in semiannual, fourmonth and annual cycles. Propoxur was applied quarterly in Central America and Panama. In most of the countries insecticides were used more selectively. Propoxur spraying has also declined because of vector resistance and high cost. In 1976, house sprayings with DDT numbered 10,391,725 and with propoxur 956,056, which accounted for 84.0 per cent and 82.0 per cent of the respective sprayings carried out in 1975.

The information on houses sprayed in each country and cycle is given in Table 10, and on the insecticides used in 1976 and estimated for 1977 in Table 11. Malaria programs consumed 7,754 metric tons of DDT (100 per cent) in 1972 against

only 4,249 tons in 1976. This drop was due particularly to: 1) rising prices; 2) the difficulties governments had in purchasing imported materials with local currencies since UNICEF and other agencies discontinued their support to the programs; 3) the substitution of other insecticides because of vector resistance to DDT; and 4) the reduction of spraying operations in some areas for epidemiological reasons.

Classical mosquito control techniques such as larviciding, drainage and land-fills were used more extensively in Haiti and Nicaragua with good results. Other measures were also experimented with, like larvivorous fish in the Dominican Republic and Ecuador, intermittent irrigation in rice-growing areas in Haiti and the use of diclorvos in Brazil to assess its effectiveness and applicability in areas where Kerteszia were present. To promote the use of combined and particularly of antilarval techniques, an international seminar on mosquito control was held in the State of California, USA, and in El Salvador.

Table 12 summarizes the results of active and passive case detection work by countries, and Table 13 the personnel of the malaria programs by functions. Table 14 indicates the means of transport used in the malaria program by countries. Poor transport facilities are a serious problem of field operations in some countries.

D. Budget

Table 15 summarizes the expenditures made by the Governments in 1975 and 1976 and their estimated budgets for malaria programs in 1977. Of the 21 countries and territories that had malaria programs, the budget was increased in 17, remained unchanged in two and was reduced slightly in another two. As can be seen, the national funds assigned to malaria programs increased from US$81,724,153 in 1975 to US$93,010,889 in 1976 (a 13.8 per cent increase).

Table 16 shows the expenses incurred by PAHO/WHO in 1976 and its budget for technical cooperation with the countries in 1977-1979. The PAHO/WHO and US/AID contributions assigned to each country in 1976 and the amounts estimated for 1977 are presented in Table 17.

Graphs 1 and 2 present the funds invested by governments in malaria programs and the contributions of international agencies, from 1957 to 1976. In addition, from 1971 to 1973 the Government of the Federal Republic of Germany contributed US$2,546,000 in grants to the malaria program in the Americas.

II. SPECIAL TECHNICAL PROBLEMS

Map 3 shows the geographical distribution of the areas with technical problems. Table 18, with its important footnote on the Amazon Region, lists the affected areas in each one of the ten countries where technical problems exist. Eight countries reported technical problems in 1975 and were joined by Honduras and Perú in 1976. The areas where malaria transmission persists because of technical problems, harbor ten million people, or 16 per cent of the population of the areas still in the attack phase (61 million).

There are many areas classified as in the attack phase where house sprayings with insecticides may be suspended in 1977 on epidemiological grounds. The areas with technical problems do not include areas where antimalarial operations are suspended solely for lack of financing, even though the incidence of malaria increased because of this reason.

Map 4 shows the distribution of A. (N) albimanus and its resistance to DDT and propoxur, and Map 5 the distribution of A. (A) pseudopunctipennis and its resistance to DDT.

A. albimanus has developed resistance to DDT in areas of the Pacific Coast from Southern Mexico to Panamá, and in Haiti and the Dominican Republic. It was discovered in Guatemala in 1959, in El Salvador in 1960, and later in other countries. Though on occasion an apparently high survival rate can be compatible with relative control, there can be no doubt that the resistance of A. albimanus in these areas has diminished and even nullified the effectiveness of DDT in malaria control. Studies indicate that the resistance has resulted from the massive application of agricultural insecticides and that establishment of rules and regulations on the use of those insecticides depends more on an agrarian policy than on that of public health.

In El Salvador, Guatemala, Honduras and Nicaragua, DDT was replaced with propoxur in most of the areas of A. albimanus resistance to DDT, and this substitution improved the situation. The rapid development of A. albimanus resistance to propoxur discovered in Nicaragua and El Salvador in 1971, in Guatemala in 1973 and in Honduras in 1975, has joined with resistance to DDT to limit seriously the use of these insecticides in Central America; the observed cross resistance between carbamates and organophosphorus compounds also restricts the possible use of insecticides of the latter group in those areas.

A. pseudopunctipennis developed resistance over an extensive area of the Balsas river basin in Mexico and in other parts of Mexico and Guatemala. The resistance of this species to DDT in Mexico is not high and tests conducted point to susceptibility to malathion, fenitrothion and propoxur.

The areas of vector resistance to insecticides contain 20 per cent of the total population of all malarious areas in the affected countries.

Studies done in several countries have shown that, even though resistance is present in areas of persistent transmission, it is not the only cause of the problem. In areas where vectors are susceptible to insecticides, persistence can result from other epidemiological and anthropological factors.

The behaviouristic resistance of vectors in some areas of persistent transmission led to special studies for the selection of other methods for the control of A. nuñeztovari in Venezuela and Colombia, of A. cruzi cruzi in Brazil, and A. pseudopunctipennis in Mexico. Several studies demonstrated exophily and endophagy in A. darlingi in Brazil and Colombia, and in A. nuñeztovari in Colombia and Venezuela. The brevity of vector contacts with sprayed surfaces, their resting on unsprayed surfaces, and irritability to DDT are causes that can also contribute to the persistence of transmission.

P. falciparum resistance to chloroquine has been known in the Americas since 1960 and is very widespread in Colombia and Brazil. It is also present in some areas of Guyana, Panama, Surinam and Venezuela, and cases of resistance were recently discovered in northern Ecuador and on the coast of French Guiana. In the areas where the problem exists, the cases displaying resistance are mostly R-I. "In vitro" susceptibility tests to arrive at a better understanding of the extent and intensity of the problem are continuing, (See Map 6). PAHO/WHO prepared and distributed a technical document on the treatment of grave cases and of resistant cases of P. falciparum.

Human behaviour often creates greater problems than vectors and parasites do. The experience of the Americas shows that the human ecology is as important as that of the vector, and problems of the human ecology and ethology are often the worst contributing factors of the persistence of malaria transmission. These problems include makeshift housing, habits and customs that expose humans to increased contacts with the vector, the different kinds of human migrations, which are growing in intensity in the developing countries, impounded waters, irrigation systems, the working of hydroelectric installations, road construction and new human settlements, whether government-organized or spontaneous. Another serious problem is the difficulty of access to localities and the wide dispersal of homes characteristic of malarious rural areas in the Americas.

To these problems other operational, administrative and financial ones will have to be added. Many problems would be solved if present working systems were improved, and applied on an epidemiological basis and with financial support.

In the Region of the Americas there are recent examples showing a close correlation between a curtailment of funds, a reduction of operations and a considerable rise in the incidence of malaria.

On the whole, the causes of the persistence of transmission are not exclusively technical, and the great majority of them require a multidisciplinary approach that compels better coordination, and makes it urgent the needs for operational research at country level.

III. RESEARCH

Research continues to be an important component of the Organization's antimalarial program, research is therefore control oriented and consist mainly on epidemiological or operational research. The Organization also encourages and supports research in the development of new methods of control.

A. Evaluation of insecticides

Testing of chlorfoxim (OMS-1197) on sprayed panels indicated a long residual effect on organic surfaces, palm and wood, both with propoxur-susceptible and propoxur-resistant A. albimanus strains. Continued observations have shown high mortalities for over two years of the first strain and for over 400 days for the second.

A locality scale trial with chlorfoxim was completed in December 1976 and trials are being developed in 1977 for the testing of this insecticide in combination with other attack measures in Nicaragua.

Permethrin (OMS-1821) showed to be very active and to have a good residual effect on palm and wood panels at dosages as low as 0.5 g/m^2. Results were equally satisfactory with propoxur resistant and susceptible strains, with some indication of the former strain being more susceptible to permethrin.

Testing this insecticide on experimental huts started in 1977 in El Salvador and Nicaragua.

Panel testing of iodofenphos (OMS-1211) was completed in 1976 showing very little effect against the propoxur-resistant strain.

B. Biological control of anophelines

Biological studies were carried in El Salvador and Nicaragua on the larvivorous fish Poecilia sphenops including breeding and feeding, collection transport and distribution. Field trials are being planned in Nicaragua to ascertain their potential use as an antimalarial measure.

Field trials with Poecilia reticulata are being carried out with encouraging results in Ecuador and Dominican Republic.

A program of collection, identification and study of mosquito pathogens is being carried out in cooperation with the WHO Collaborating Laboratory on Biological Control of Vectors at the Ohio State University. A new strain of Bacillus sphaericus which is highly pathogenic for Anopheles albimanus, was found in El Salvador.

C. Malaria chemotherapy

Studies have continued on the distribution of P. falciparum strains resistant to 4 aminoquinolines in South America. "In vitro" studies in Guyana and "in vivo" studies in Ecuador, confirmed the extension of resistance to areas of both countries.

Preparations were made for starting, late in 1977, controlled clinical trials with the new antimalarial drug mefloquine in Colombia and Brazil.

D. Interruption of man mosquito contact and source reduction

A village scale trial was carried out in 1976-77 in a coastal locality of El Salvador to test the feasibility and acceptability of a method of house protection with mosquito nets of houses with low roofs and no walls. There was a considerable reduction in resting and biting densities indoors, acceptability was very good and it is considered that such a method may be useful as a complementary measure in certain conditions.

Demonstration projects of integrated malaria control are being implemented in several problem localities in Nicaragua and Haiti combining the use of source reduction methods with larviciding, selective insecticide spraying and drugs; larvivorous fish are being considered also in some of these areas.

E. Entomological studies

Collaborative studies were continued with the University of California (Riverside) on the phenomenon of cross resistance to insecticides and the development and mechanisms of resistance to organochlorines, organophosphorus carbamates and pyrethroid insecticides.

Epidemiological studies on the extension and operational implications of vector resistance to insecticides continued in Mexico, Central America, Panamá and Colombia.

Behavioural and cytogenetic studies of anophelines continued in Colombia, Venezuela and Brasil in collaboration with the Florida Medical Entomological Laboratory.

F. Serological studies

Seroepidemiological studies were started or continued in Mexico, Panama, Brazil and Costa Rica, using the immunofluorescence technique, national personnel was trained from these countries in laboratory techniques and field applications.

G. Immunological studies

A research project on malaria immunology has been established by the Organization, the Ministry of Health of Colombia and the University of New Mexico, with the assistance of the US/AID, at the National Institute of Health in Bogotá with the purpose of studying human malaria immunology and immunization techniques in animal models.

Studies for the improvement of animals models of human malaria are being carried out in collaboration by the Gorgas Research Laboratory and PAHO in Panama.

IV. TRAINING OF NATIONAL AND INTERNATIONAL STAFF

In 1976 the School of Malariology and Environmental Sanitation at Maracay, Venezuela, completed its XXXIII International Course in Malaria and Environmental Sanitation. In addition to local participants, a physician and a biologist, both Peruvians, attended the course under fellowships provided by the Government of Venezuela and supported by PAHO/WHO.

The School of Public Health of São Paulo University, Brazil, organized and conducted a three-and-a-half month university level course in entomology that was supported by the Organization. The course was attended by 12 professionals from Bolivia, Brazil, Colombia, Nicaragua, Panamá and Perú under PAHO fellowships.

The Organization collaborated with the Department of Health and Welfare of Mexico on the development of a first "Master's Course in Public Health with emphasis on Malaria and Other Parasitic Diseases" given in the School of Public Health from 16 February to 17 December 1976. This was the first course in public health in Latin America to emphasize tropical diseases of major importance in the Region. It was attended by 12 physicians, some from Mexico and Venezuela under fellowships provided by their governments, and others from Argentina, Brazil, Colombia, Ecuador, Guatemala and Haiti under PAHO fellowships.

With the collaboration of the Agency for International Development and the Department of Health of California of the United States, and of the Ministry of Public Health and Social Welfare of El Salvador, the Organization developed a refresher course in the latest techniques for control of the vectors of malaria and other insect-transmitted diseases. The first part of the course was held in California and the second in El Salvador, from 12 to 31 July 1976, and was attended by engineers from 14 countries in the Americas and one from the Eastern Mediterranean Region (EMRO/WHO).

As in earlier years, under the malaria control programs semi-annual short courses of refresher training were conducted for field staff and of training in new public health activities for selected staff members.

V. INTERNATIONAL COORDINATION AND COOPERATION

PAHO/WHO contributed to the continent-wide malaria program by providing drugs, full-time professional and technical staff, short-term consultants, and fellowships (Table 19). Table 20 shows the distribution of the PAHO/WHO technical staff assigned to these programs from 1974 to 1977 by categories (medical officers, sanitary engineers, sanitary inspectors, entomologists and others).

The United States Government supported this program and made extra-budgetary contributions for a course in vector control that was attended by engineers from 14 countries, and a grant to the malaria immunology research project in Colombia, and the Government of Venezuela supported the program by providing fellowships for personnel training in malariology and environmental sanitation.

The PAHO, WHO and US/AID contributions to malaria programs in 1976 and the estimated figures for 1977 are given in Table 17.

With the collaboration of PAHO/WHO the national malaria programs held intercountry meetings to exchange information and coordinate activities in border areas.

Panamá - Costa Rica, 19 May at Villa Neily, Costa Rica

Colombia - Ecuador, 28 June 2 July at Tumaco, Colombia

Argentina - Bolivia, 11 October at Tartagal, Argentina

Brazil - Guyana - French Guiana - Surinam - Venezuela, 18-20 October at Georgetown, Guyana

Colombia and Venezuela have set up a Colombo-Venezuelan Group on Malaria and Other Insect Borne Diseases, which meets yearly in the towns of Cúcuta, Colombia, and San Cristobal, Venezuela, as provided in the Colombo-Venezuelan Sanitary Border Agreement.

VI. SUPPORT BY MALARIA SERVICES TO OTHER HEALTH PROGRAMS

There are today 21 active malaria programs in the Region, of which ten are developing national programs for the control or eradication of A. aegypti, two have specific programs for the surveillance and control of dengue, four carry on activities for the prophylaxis and control of Chagas' disease, three have programs for the study and control of filariasis, including onchocerciasis, and one has added the study and treatment of leishmaniasis cases. Six of these programs are carrying out activities in support of immunization programs, one in family planning and one on yaws, and one is developing surveys for the early detection of cases of schistosomiasis, which is not endemic in the country in question.

Table 21 lists the health activities developed by malaria services in the various countries during 1976.

Table 22 summarizes the number of laboratories for the microscopic diagnosis of malaria in the Region and the staff employed in them, and Map 7 shows the geographical locations of those laboratories, which will constitute a good resource for future efforts to expand the coverage of primary health services.

VII. OTHER PARASITIC DISEASES

It is estimated that more than 10 million people are infected with Trypanosoma cruzi in the Americas and that at least 25 million more are exposed to the infection. In its XXIV Meeting the Directing Council of PAHO/WHO approved Resolution XVII requesting priority for Chagas' disease in disease research and control programs. Some countries have already augmented their control activities and others are conducting preliminary surveys to acquire a better knowledge of the distribution of the disease. In 1976 PAHO published "Quantitatively Standardized complement-fixation methods for critical evaluation of antigens prepared from Trypanosoma cruzi." A short-term consultant visited several countries in connection with the use of this method.

In 1976 a questionnaire on schistosomiasis control and research was distributed and answered by 50 countries and territories in the Region. Seven countries and territories - Brazil, the Dominican Republic, Martinique, Puerto Rico, St. Lucia, Surinam and Venezuela - described schistosomiasis as a national health problem. The other 43 countries said they had no schistosomiasis problem, though Argentina and Paraguay added that they were maintaining vigilance services for the rapid detection of imported cases and the study of possible intermediary hosts in order to prevent invasions of the disease.

As can be seen in Table 23, about 37 million people are exposed to infection with S. mansoni, and in 1976 the countries used a budget of US$5,697,000 for specific control programs. This budget did not cover the activities of the health services of Argentina and Paraguay, or the research done by universities and other institutions in several countries.

Schistosomiasis (S. mansoni) is endemic in 16 of the 27 federal territorial units of Brazil, particularly in the northeast. The endemic area of Brazil harbors a population of about 30 million, of which a number estimated at more than eight million is infected. In Venezuela about four million people are exposed in the north central part of the country (the Federal District, and the states of Aragua, Carabobo, Miranda and Guárico). In Surinam the disease is prevalent on the coast and the number of people exposed is estimated at 8,000. There are also a few small foci on some Caribbean islands.

Concerning filariasis it must be mentioned that there are in the Americas human infections of Wuchereria bancrofti, Acanthocheilonema perstans, and Mansonella ozzardi.

The nocturnal form, W. bancrofti, is found in coastal areas of Central and South America, particularly on the Atlantic, and on some Caribbean islands. Prevalence has diminished somewhat in recent years as a result of mosquito control measures and environmental sanitation in urban areas.

The infections of A. perstans and M. ozzardi are of little importance as health problems.

Another human filariasis found in the Americas is onchocerciasis, caused by O. volvulus, which affects limited areas of Mexico, Guatemala, Colombia, Venezuela and Brazil.

In Mexico, O. volvulus is found in the states of Oaxaca and Chiapas, while in Guatemala it occurs in seven of the 22 departments and other administrative units in the country.

In Colombia a small focus has been identified in the Micay river area on the Pacific coast. In Venezuela three foci have been identified, one in the east, another in the center, and a third near the Brazilian border. In Brazil there is a focus in the state of Amazonas.

On the whole, it is felt that the distribution of the human filariases in the Americas, their epidemiology and clinical pathology, and the biology of the vector or vectors, are insufficiently understood, and should be studied further.

The Directing Council of the Organization (CD.24/FR Res. XXVII) recognized the importance of the parasitic diseases as causes of morbidity and mortality in the Americas and the need to coordinate research in the countries, and accepted the offer of the Venezuelan Government that the Center for Research and Training in Leprosy and Tropical Diseases be designated as a national institute associated with PAHO's technical cooperation program.

Table 1

POPULATION IN THE MALARIOUS AREAS
IN THE AMERICAS, 1958-1976

(Population in thousands)

Year	Originally malarious areas					Total population
	Maint. phase	Consolid. phase	Attack phase	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

Table 2

STATUS OF THE MALARIA PROGRAM IN THE AMERICAS, BY POPULATION, 1976

(Population in thousands)

Country or other political or administrative unit	Total population	Population of originally malarious areas							
		Total		Malaria eradication claimed (maintemamce phase)		Consolidation phase		Attack phase	
		Total	%	Total	%	Total	%	Total	%
Argentina	25 700	3 103	12.1	2 971	95.7	62	2.0	70	2.3
Bahamas	212a)	-	-	-	-	-	-	-	-
Barbados	247a)	-	-	-	-	-	-	-	-
Bolivia	5 771	1 830	31.7	-	-	1 089	59.5	741	40.5
Brazil	110 123	44 369	40.3	10 970	24.7	14 274	32.2	19 125	43.1
Canada	23 168a)	-	-	-	-	-	-	-	-
Chile	10 967	237	2.2	237	100.0	-	-	-	-
Colombia	25 246	14 943	59.2	-	-	10 168	68.0	4 775	32.0
Costa Rica	2 075	664	32.0	-	-	500	75.3	164	24.7
Cuba	9 539	3 186	35.1	3 186c)	100.0	-	-	-	-
Dominican Republic	4 835	4 804	99.4	4 674	97.3	44	0.9	86	1.8
Ecuador	6 937	4 271	61.6	-	-	1 811	42.4	2 460	57.6
El Salvador	4 218	3 625	85.9	-	-	-	-	3 625	100.0
Grenada and Carriacou	110	41	37.3	41	100.0	-	-	-	-
Guatemala	6 451	2 405	37.3	-	-	-	-	2 405	100.0
Guyana	836	836	100.0	784	93.8	15	1.8	37	4.4
Haiti	4 584	4 025	87.8	-	-	-	-	4 025	100.0
Honduras	2 844	2 583	90.8	-	-	475	18.4	2 108	81.6
Jamaica	2 080	1 626b)	78.2	1 626c)	100.0	-	-	-	-
Mexico	60 681	31 056	51.2	-	-	15 125	48.7	15 931	51.3
Nicaragua	2 300	2 300	100.0	-	-	-	-	2 300	100.0
Panama	1 719	1 655	96.3	-	-	1 353	81.8	302	18.2
Paraguay	2 724	2 279	83.7	-	-	1 285	56.4	994	43.6
Peru	15 177	5 334	35.1	1 495	28.0	2 396	44.9	1 443	27.1
Surinam	422	268	63.5	190	70.9	46	17.2	32	11.9
Trinidad and Tobago	1 170	1 054	90.1	1 054c)	100.0	-	-	-	-
United States of America	214 649a)	61 175b)	28.5	61 175c)	100.0	-	-	-	-
Uruguay	3 101	-	-	-	-	-	-	-	-
Venezuela	12 361	9 264	74.9	8 714d)	94.1	-	-	550	5.9
Antigua	72a)	-	-	-	-	-	-	-	-
Belize	136	136	100.0	-	-	109	80.1	27	19.9
Bermunda	57a)	-	-	-	-	-	-	-	-
Canal Zone	45a)	45	100.0	-	-	45	100.0	-	-
Cayman Islands	11a)	-	-	-	-	-	-	-	-
Dominica	77	15b)	19.5	15c)	100.0	-	-	-	-
Falkland Islands	2a)	-	-	-	-	-	-	-	-
French Guiana	55	55	100.0	34	61.8	16	29.1	5	9.1
Guadeloupe	360a)	315b)	100.0	315c)	100.0	-	-	-	-
Martinique	370a)	231b)	62.4	231	-	-	-	-	-
Montserrat	13a)	-	-	-	-	-	-	-	-
Netherland Antilles	246a)	-	-	-	-	-	-	-	-
Puerto Rico	3 164a)	3 164b)	100.0	3 164c)	100.0	-	-	-	-
St. Kitts, Nevis, Anguilla	66a)	-	-	-	-	-	-	-	-
St. Lucia	115	109b)	94.8	109	100.0	-	-	-	-
St. Pierre & Miquelon	5a)	-	-	-	-	-	-	-	-
St. Vincent	107a)	-	-	-	-	-	-	-	-
Turks & Caicos Islands	6a)	-	-	-	-	-	-	-	-
Virgen Islands (U.K.)	12a)	-	-	-	-	-	-	-	-
Virgen Islands (U.S.A.)	83	83	100.0	83	100.0	-	-	-	-
Total	565 249	211 086	37.3	101 068	47.9	48 813	23.1	61 205	29.0

a) Provisional Mid-year Population estimated by PAHO. b) Estimated. c) Population in areas where eradication of malaria has been certified by PAHO/WHO. d) Includes an area with 6,451,445 where eradication of malaria has been certified by PAHO/WHO.

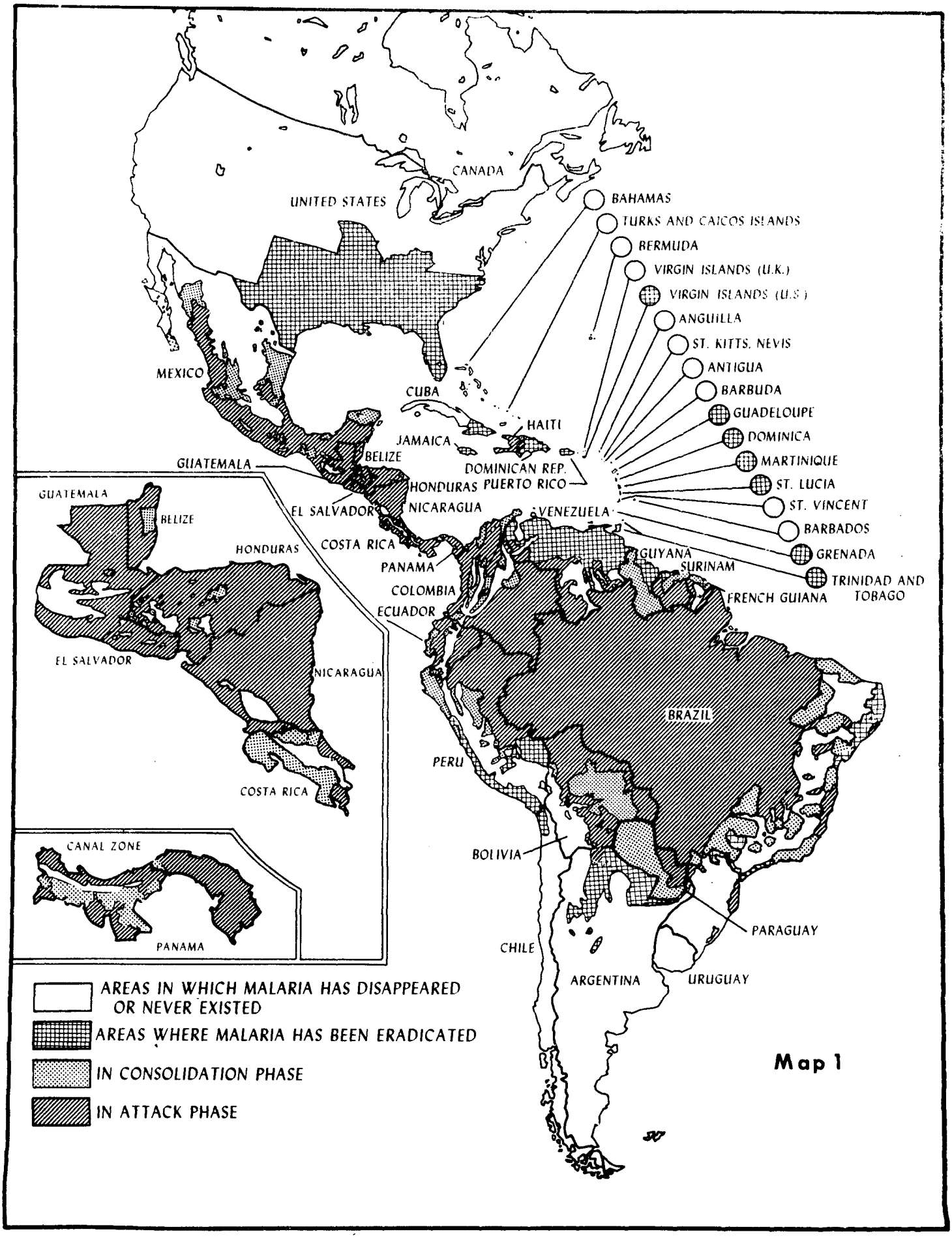
Table 3

STATUS OF THE MALARIA PROGRAM IN THE AMERICAS, BY AREA, 1976

(Area in Km^2)

Country or other political or administrative unit	Total area	Originally malarious areas							
		Total		Malaria eradication claimed (maintenance phase)		Consolidation phase		Attack phase	
		Total	%	Total	%	Total	%	Total	%
Argentina	4 024 458	349 051	8.7	334 527	95.9	3 249	0.9	11.275	3.2
Bahamas	11 396	-	-	-	-	-	-	-	-
Barbados	430	-	-	-	-	-	-	-	-
Bolivia	1 098 581	821 346	74.8	-	-	367 940	44.8	453 406	55 2
Brazil	8 511 965	6 897 891	81.0	132 912	1.9	525 829	7.6	6 239 150	90.5
Canada	9 221 016	-	-	-	-	-	-	-	-
Chile	797 054	55 287	6.9	55 287	100.0	-	-	-	-
Colombia	1 138 914	970 849	85.2	-	-	113 176	11.7	857 673	88.3
Costa Rica	50 900	35 446	69.6	-	-	21 462	60.5	13 984	39.5
Cuba	114 524	37 502	32.7	37 502a)	100.0	-	-	-	-
Dominican Republic	48 442	47 562	98.2	44 281	93.1	1 096	2.3	2 185	4.6
Ecuador	291 906	175 462	60.1	-	-	27 797	15.8	147 665	84.2
El Salvador	21 149	18 655	88.2	-	-	-	-	18 655	100.0
Grenada and Carriacou	344	103	29.9	103a)	100.0	-	-	-	-
Guatemala	108 889	80 350	73.8	-	-	-	-	80 350	100.0
Guyana	215 025	215 025	100.0	39 437	18.3	84 114	39.1	91 474	42.5
Haiti	27 750	19 100	68.8	-	-	-	-	19 100	100.0
Honduras	112 088	101 351	90.4	-	-	7 023	6.9	94 328	93.1
Jamaica	11 310	10 028	88.7	10 028a)	100.0	-	-	-	-
Mexico	1 967 183	1 150 000	58.5	-	-	444 339	38.6	705 661	61.4
Nicaragua	127 358	118 358	92.9	-	-	-	-	118 358	100.0
Panama	75 650	69 840	92.3	-	-	29 705	42.5	40 135	57.5
Paraguay	406 752	406 552	100.0	-	-	301 189	74.1	105 363	25.9
Peru	1 285 215	961 171	74.8	195 418	20.3	222 330	23.1	543 423	56.6
Surinam	163 820	163 750	100.0	8 955	5.5	55 345	33.8	99 450	60.7
Trinidad and Tobago	5 605	5 444	97.1	5 444a)	100.0	-	-	-	-
United States	9 365 604	2 309 876	24.7	2 309 876a)	100.0	-	-	-	-
Uruguay	186 926	-	-	-	-	-	-	-	-
Venezuela	915 741	600 000	65.5	460 054b)	76.7	-	-	139 946	23.3
Antigua	280	-	-	-	-	-	-	-	-
Bermuda	53	-	-	-	-	-	-	-	-
Belize	22 965	22 965	100.0	-	-	14 139	61.6	8 826	38.4
Canal Zone	1 432	1 432	100.0	-	-	1 432	100.0	-	-
Cayman Islands	183	-	-	-	-	-	-	-	-
Dominica	751	152	20.2	152a)	100.0	-	-	-	-
Falkland Islands	11 961	-	-	-	-	-	-	-	-
French Guiana	90 000	90 000	100.0	200	0.2	82 300	91.5	7 500	8.3
Guadeloupe	1 779	1 136	63.9	1 136	100.0	-	-	-	-
Martinique	1 080	300	27.8	300	100.0	-	-	-	-
Montserrat	84	-	-	-	-	-	-	-	-
Netherland Antilles	961	-	-	-	-	-	-	-	-
Puerto Rico	8 899	8 899	100.0	8 899a)	100.0	-	-	-	-
St. Kitts, Nevis, Anguilla	396	-	-	-	-	-	-	-	-
St. Lucia	603	510	84.6	510a)	100.0	-	-	-	-
St. Pierre and Miquelon	240	-	-	-	-	-	-	-	-
St. Vincent	389	-	-	-	-	-	-	-	-
Turks and Caicos Islands	522	-	-	-	-	-	-	-	-
Virgin Islands (U.K.)	174	-	-	-	-	-	-	-	-
Virgin Islands (U.S.A.)	345	345	100.0	345a)	100.0	-	-	-	-
Total	40 449 092	15 745 738	38.9	3 645 366	23.2	2 302 465	14.6	9 797 907	62.2

a) Area where eradication of malaria has been certified by PAHO/WHO. b) Includes an area of 407 945 Km^2 where eradication of malaria has been certified by PAHO/WHO.



STATUS OF THE MALARIA PROGRAM IN THE AMERICAS, 31 DECEMBER 1975

STATUS OF THE MALARIA PROGRAM IN THE AMERICAS, 31 DECEMBER 1976

Table 4

MALARIA MORBIDITY IN THE AMERICAS

1958-1976

Year	Population		Blood Slides			Morbidity per 100,000 inhabitants	
	Total Country	Total malarious area	examined	Positive	%	Total Country	Malarious area
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	11 731 451	333 245	2.8	71.87	200.18
1967	474 868	169 901	11 609 226	369 341	3.2	77.78	217.39
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	9 351 875	379 336	4.1	67.11	179.71

Table 5

CASE DETECTION BY COUNTRY AND PHASE OF PROGRAM, 1976

Country or other political or administrative unit	Total		Maintenance phase		Consolidation phase		Attack phase		Non-malarious areas	
	Slides examined	Positive	Slides examined	Positive	Slides examined	Positive	Slides examined	Positive	Slides examined	Positive
Argentina	47 610	70	34 612	9	7 889	0	5 108	60	1	1
Bahamas	...	1	-	-	-	-	-	-	...	1
Barbados	...	1	-	-	-	-	-	-	...	1
Bolivia	124 101	6 714	-	-	31 149	928	91 915	5 728	1 037	58
Brazil	2 603 512	89 959	164 208	664	682 016	1 515	1 682 408	85 569	74 880	2 211
Canada	...	86	-	-	-	-	-	-	...	86
Chile	...	1	...	1	-	-	-	-	-	-
Colombia	386 897	39 022	-	-	163 984	4 566	221 675	34 273	1 238	183
Costa Rica	171 753	473	-	-	79 424	149	91 642	257	687	67
Cuba	316 110	162	316 110	162	-	-	-	-	-	-
Dominican Republic	436 068	586	391 277	351	7 643	3	37 141	232	7	0
Ecuador	313 053	10 974	-	-	124 036	1 128	187 016	9 811	2 001	35
El Salvador	533 610	83 290	-	-	-	-	507 107	81 634	26 503	1 656
Grenada and Carriacou	30	0	30	0	-	-	-	-	-	-
Guatemala	435 097	9 616	-	-	-	-	429 955	9 397	5 142	219
Guyana	102 815	4 642	23 613	93	2 876	29	76 326	4 520	-	-
Haiti	380 184	15 087	-	-	-	-	380 184	15 087	-	-
Honduras	295 128	48 804	-	-	24 938	670	268 188	48 079	2 002	55
Jamaica	14 541	6	14 541	6	-	-	-	-	-	-
Mexico	1 749 778	18 153	-	-	403 376	522	1 322 319	17 495	24 083	136
Nicaragua	250 582	26 228	-	-	-	-	250 582	26 228	-	-
Panama	384 941	727	-	-	142 932	60	242 009	667	-	-
Paraguay	152 410	140	-	-	65 555	0	86 556	140	299	0
Peru	243 675	18 462	41 667	74	119 077	4 556	82 931	13 832	-	-
Surinam	79 564	537	13 457	10	18 917	39	45 670	462	1 520	26
Trinidad and Tobago	10 874	3	10 874	3	-	-	-	-	-	-
United States of America	331	250	331	250	-	-	-	-	-	-
Venezuela	274 150	4 740	167 352	739	-	-	105 481	3 831	1 317	170
Belize	23 513	199	-	-	16 771	156	6 742	43	-	-
Canal Zone	1 563	7	-	-	1 563	7	-	-	-	-
Dominica	0	0	-	-	-	-	-	-	-	-
French Guiana	19 854	394	5 410	145	6 834	107	7 610	142	-	-
Guadeloupe	0	0	-	-	-	-	-	-	-	-
Puerto Rico	...	1	...	1	-	-	-	-	-	-
St. Lucia	131	1	131	1	-	-	-	-	-	-
Total	9 351 875	379 336	1 183 613	2 509	1 898 980	14 435	6 128 565	357 487	140 717	4 905

Table 6

SLIDES EXAMINED AND POSITIVES, BY SPECIES AND CLASSIFICATION,
MAINTENANCE AREAS, 1976

Country or other political or administrative unit	Blood slides examined	Total positive	Specie of parasite				Classification of cases							
									Imported					
			P. falciparum	P. vivax	P. malariae	Mixed infections	Autochthonous	Relapsing	from abroad	from areas within country	Induced	Introduced	Criptic and Unclassified	No investigated
Argentina	34 612	9	-	9	-	-	1	1	5	1	-	-	1	-
Brazil	164 208	664	127	528	-	9	194	2	5	432a)	2	2	1	26
Chile	...	1	1	-	-	-	-	-	1	-	-	-	-	-
Cuba	316 110	162	54	74	34	-	-	1	160	-	-	1	-	-
Dominica	...	0	-	-	-	-	-	-	-	-	-	-	-	-
Dominican Republic ...	391 277	351	350	1	-	-	-	-	189	-	-	89	-	73
French Guiana	5 410	145	136	9	-	-	44	-	11	57	-	-	30	3
Grenada and Carriacou	30	0	-	-	-	-	-	-	-	-	-	-	-	-
Guadeloupe	...	...	-	-	-	-	-	-	-	-	-	-	-	-
Guyana	23 613	93	53	38	-	2	-	-	-	16	-	16	-	61
Jamaica	14 541	6	4	2	-	-	-	-	6	-	-	-	-	-
Peru	41 667	74	-	70	4	-	-	6	3	60c)	3	2	-	-
Puerto Rico	...	1	-	1	-	-	-	-	1	-	-	-	-	-
St. Lucia	131	1	-	-	1	-	-	1	-	-	-	-	-	-
Surinam	13 457	10	10	-	-	-	-	-	-	9d)	-	-	-	1
Trinidad and Tobago	10 874	3	-	2	1	-	-	-	2	-	-	-	1	-
United States of America	331	250b)	43	79	4	-	-	-	249	-	1	-	-	-
Venezuela	167 352	739	182	546	-	11	193	3	121	287	2	132	1	-
Total	1 183 613	2 509	960	1 359	44	22	432	14	753	862	8	242	34	164

a) Eleven cases imported from Consolidation phase area. b) Includes 4 cases P. ovale and 120 with undetermined infection. c) Ten cases imported from Consolidation phase area. d) Three cases imported from Consolidation phase area.

Table 7

SLIDES EXAMINED AND POSITIVES, BY SPECIES AND CLASSIFICATION, CONSOLIDATION AREAS, 1976

Country or other political or administrative unit	Population (thousands)	Blood slides examined	Total cases	API*	Specie of parasite				Origin of infections							
					P. falciparum	P. vivax	P. malariae	Mixed infections	autochthonous	Relapsing	Imported		Induced	Introduced	Cryptic	Unclassified or not investigated
											from abroad	from areas within country				
Argentina	62	7 889	0	-	-	-	-	-	-	-	-	-	-	-	-	-
Belice	109	16 771	156	1.4	-	156	-	-	106	-	16	6	-	5	6	17
Bolivia	1 089	31 149	928	0.9	30	898	-	-	253	-	-	271	-	-	-	404
Brazil	14 274	682 016	1 515	0.1	330	1 170	1	14	396	5	5	888a)	4	9	3	205
Colombia	10 168	163 984	4 566	0.4	1 718	2 823	-	25	519	9	69	3 444	5	3	117	400
Costa Rica	500	79 424	149	0.3	28	121	-	-	73	2	28	6	-	15	-	25
Dominican Republic	44	7 643	3	0.1	3	-	-	-	-	-	-	-	-	-	-	3
Ecuador	1 811	124 036	1 128	0.6	338	785	1	4	689	2	1	125	1	15	-	295
French Guiana	16	6 834	107	6.7	104	3	-	-	99	-	3	2b)	-	-	3	-
Guyana	15	2 876	29	1.9	1	28	-	-	-	-	-	2	-	-	-	27
Honduras	475	24 938	670	1.4	19	646	-	5	19	7	1	23	-	-	-	620
Mexico	15 125	403 376	522	0.03	-	520	2	-	196	63	1	203	2	-	4	53
Panama	1 353	142 932	60	0.04	16	44	-	-	33	-	9	10	2	5	-	1
Paraguay	1 285	65 555	0	-	-	-	-	-	-	-	-	-	-	-	-	-
Peru	2 396	119 077	4 556	1.9	-	4 556	-	-	1 365	18	-	245	-	2	2	2 924
Surinam	46	18 917	39	0.8	39	-	-	-	31	-	-	1	-	-	-	7
Zona del Canal	45	1 563	7	0.2	-	7	-	-	-	-	7	-	-	-	-	-
Total	48 813	1 898 980	14 435	0.3	2 626	11 757	4	48	3 779	106	140	5 226	14	54	135	4 981

* Annual Parasite Incidence by 1,000 inhabitants.

a) 2 Cases imported from maintenance phase areas. b) 1 Case imported from maintenance phase areas.

Table 8

SLIDES EXAMINED AND POSITIVES BY SPECIES,
ATTACK AREAS, 1976

Country or other political or administrative unit	Slides examined			Species found			
	Total	Positive					
		Number	Percentage	P. falciparum	P. vivax	P. malariae	Mixed infections
Argentina	5 108	60	1.2	-	60	-	-
Belize	6 742	43	0.6	-	43	-	-
Bolivia	91 915	5 728	6.2	1 319	4 376	-	33
Brazil	1 682 408	85 569	5.1	35 272	49 818	36	443
Colombia	221 675	34 273	15.5	16 824	17 245	10	194
Costa Rica	91 642	257	0.3	118	139	-	-
Dominican Republic	37 141	232	0.6	232	-	-	-
Ecuador	187 016	9 811	5.2	1 563	8 205	8	35
El Salvador	507 107	81 634	16.1	13 270	67 918	-	446
French Guiana	7 610	142	1.9	114	28	-	-
Guatemala	429 955	9 397	2.2	295	9 085	-	17
Guyana	76 326	4 520	5.9	2 385	2 120	-	15
Haiti	380 184	15 087	4.0	15 078	5	2	2
Honduras	268 188	48 079	17.9	2 418	45 500	-	161
Mexico	1 322 319	17 495	1.3	-	17 493	2	-
Nicaragua	250 582	26 228	10.5	3 350	22 715	-	163
Panama	242 009	667	0.3	319	346	-	2
Paraguay	86 556	140	0.2	33	94	-	13
Peru	82 931	13 832	16.7	4	13 822	6	-
Surinam	45 670	462	1.0	344	118	-	-
Venezuela	105 481	3 831	3.6	779	3 018	4	30
Total	6 128 565	357 487	5.8	93 717	262 148	68	1 554

Table 9

SLIDES EXAMINED AND POSITIVES BY SPECIES,
NON-MALARIOUS AREAS, 1976

Country or other political or administrative unit	Slides examined			Species found			
	Total	Positive		*P. falciparum*	*P. vivax*	*P. malariae*	Mixed infections
		Number	Percentage				
Argentina	1	1	100.0	1	-	-	-
Bahamas	...	1	...	...	...	...	...
Barbados	...	1	...	...	...	...	...
Bolivia	1 037	58	5.6	1	57	-	-
Brazil	74 880	2 211	3.0	437	1 762	-	12
Canada	...	86	...	...	...	...	...
Colombia	1 238	183	14.8	66	117	-	-
Costa Rica	687	67	9.8	9	58	-	-
Dominican Republic	7	0	-	-	-	-	-
Ecuador	2 001	35	1.7	5	30	-	-
El Salvador	26 503	1 656	6.2	99	1 552	-	5
Guatemala	5 142	219	4.3	8	211		
Honduras	2 002	55	2.7	-	55	-	-
Mexico	24 083	136	0.6	-	126	10	-
Paraguay	299	0	-	-	-	-	-
Surinam	1 520	26	1.7	26	-	-	-
Venezuela	1 317	170	12.9	11	159	-	-
Total	140 717	4 905	3.5	663	4 127	10	17

Table 10

HOUSES SPRAYED WITH PRESIDUAL INSECTICIDES,[a] BY COUNTRY AND BY CYCLE, 1976

Country or other political or administrative unit	1st Cycle			2nd Cycle			3rd Cycle			4th Cycle			Total sprayings
	Houses planned	Houses sprayed	% sprayed	Houses planned	Houses sprayed	% sprayed	Houses planned	Houses sprayed	% sprayed	Houses planned	Houses sprayed	% sprayed	
Argentina	13 506	11 608	85.9	13 625	7 343b)	53.9	-	-	-	-	-	-	18 951
Belize	7 182	5 986	83.3	7 020	5 766	82.1	-	-	-	-	-	-	11 752
Bolivia	26 595	24 046	90.4	34 758	33 821	97.3	-	-	-	-	-	-	57 867
Brazil	2 838 133	2 315 415	81.6	2 693 208	2 333 456	86.6	-	-	-	-	-	-	4 648 871
Colombia (Semestrial) ..	324 348	267 307	82.4	317 684	261 473	82.3	-	-	-	-	-	-	528 780
(Annual cycle)	73 779	56 832	77.0	-	-	-	-	-	-	-	-	-	56 832
(Emergency cycles) ...	-	-	-	-	-	-	2 405	1 880	78.2	1 915	1 875	97.9	3 755
Costa Rica (Semestrial)	12 962	13 330	102.8	12 487	12 350	98.9	-	-	-	-	-	-	25 680
(Quarterly, propoxur)	997	1 166	117.0	1 064	1 070	100.6	-	-	-	...	5 278	-	7 514
Dominican Republic	7 176	6 350	88.5	6 358	5 552	87.3	-	-	-	-	-	-	11 902
Ecuador (Semestrial) ...	133 614	111 432	83.4	154 397	142 885	92.5	-	-	-	-	-	-	254 317
(Annual cycle)	81 008	13 654b)	16.9	-	-	-	-	-	-	-	-	-	13 654
El Salvador (Semestrial)	19 120	17 018	89.0	19 120	16 210	84.8	-	-	-	-	-	-	33 228
(Quarterly, propoxur)	-	-	-	67 227	64 531	96.0	67 227	64 883	96.5	67 227	64 461	95.9	193 875
(2 Cycles,Quarterly,propoxur)	34 609	33 715	97.4	34 609	33 802	97.7	-	-	-	-	-	-	67 517
French Guiana	2 000	1 600	80.0	2 000	1 800	90.0	-	-	-	-	-	-	3 400
Guatemala (Semestrial)	117 938	70 142	59.5	121 018	115 071	95.1	-	-	-	-	-	-	185 213
(Quarterly, propoxur)	105 935	83 514	78.8	128 973	94 077	72.9	131 027	116 917	89.2	107 362	78 123	72.4	372 631
Guyana (Semestrial)	5 393	5 186	96.2	5 393	5 307	98.4	-	-	-	-	-	-	10 493
(Annual cycle)	1 007	986	97.9	-	-	-	-	-	-	-	-	-	986
Haiti	99 007	100 008	101.0	104 705	105 759	101.0	-	-	-	-	-	-	205 767
Honduras (Spray.with DDT)	113 949	24 112	21.2	107 198	79 884	74.5	-	-	-	-	-	-	103 996
(Spray. with propoxur)	28 680	15 617	54.5	27 824	27 400	95.8	29 226	27 787	95.1	29 266	28 120	96.1	98 924
Mexico (Semestrial attack)	1 851 505	1 775 113	95.9	1 653 740	1 510 350	91.3	-	-	-	-	-	-	3 285 463
(Semestrial Consolid.)	72 268	73 704	102.0	41 873	38 093	91.0	-	-	-	-	-	-	111 797
Nicaragua (Semestrial)·	39 270	9 608	24.5	42 787	38 127	89.1	-	-	-	-	-	-	47 735
(Quarterly, propoxur)	76 467	71 136	93.0	77 153	63 177	81.9	40 474	37 136	91.8	49 844	33 974	68.2	205 423
Panama (Semestrial)	50 188	48 102	95.8	30 626	28 641	93.5	-	-	-	-	-	-	76 743
(Quarterly, propoxur)	4 100	3 808	92.9	3 308	3 239	97.9	3 352	3 125	93.2	-	-	-	10 172
Paraguay (Semestrial) ..	77 621	66 102	85.2	78 630	68 000	86.5	-	-	-	-	-	-	134 102
(Cycles of dif. frequency)	4 956	6 307	127.3	5 452	3 877	71.1	-	-	-	-	-	-	10 184
Peru	144 043	138 045	95.8	51 289	49 365	96.2	-	-	-	-	-	-	187 410
Surinam	12 527	3 365	26.9	3 540	668	18.9	-	-	-	-	-	-	4 033
Venezuela (Semestrial)..	6 244	3 325	53.3	6 224	2 916	46.9	-	-	-	-	-	-	6 241
(3 Cycles, Quarterly)	116 075	112 151	96.6	164 546	121 700	74.0	163 869	118 722	72.4	-	-	-	352 573c)
Total	6 502 202	5 489 790	84.4	6 017 836	5 275 710	87.7	437 580	370 450	84.7	256 114	211 831	82.7	11 347 781

a) DDT semestrial sprayings unless otherwise indicated. b) Incomplete cycle. c) In addition, 6 099 houses were sprayed with HCH.

Table 11

INSECTICIDES USED IN THE MALARIA PROGRAMS

1976 AND ESTIMATED 1977

Country or other political or administrative unit	DDT (kg.)				Propoxur 50% (kg.)		Other	
	1976		1977 (Est.)		1976	1977 (Est.)	1976 (E	1977 (Est.)
	100%	75%	100%	75%				
Argentina	327	11 208	1 000	15 000	-	-	-	-
Belize	1 669	4 877	2 310	8 196	-	-	-	-
Bolivia	16	38 698	100	55 000	-	-	-	-
Brazil	329 979	2 969 666	286 568	3 207 962	-	-	-	-
Colombia	369	238 556	1 000	250 000	-	10 000	17 069a)	70 000a)
Costa Rica b)	1 351	21 227	2 000	25 000	4 097	6 000	-	-
Dominican Republic	2 822	13 402	4 000	15 000	-	-	-	-
Ecuador	-	158 527	-	315 000	-	-	-	9 750
El Salvador	254	22 292	2 866	60 837	172 158	200 000	-	-
French Guiana	30 400e)	3 000e)	40 000e)	3 500e)	700	750	1 600f)	2 000f)
Guatemala	1 948	116 464	2 948	147 420	159 224	...	302c)	250 000d)
Guyana	18 381e)	4 033	23 955e)	5 670	-	-	-	-
Haiti g)	347	64 361	450	74 643	-	-	105h)	187h)
Honduras	712	48 564	4 978	95 312	46 639	72 820	-	-
Mexico	47 806	2 084 824	42 926	1 752 246	-	-	27i)	31i)
Nicaragua	483	23 830	1 000	50 000	95 000	75 000	-	-
Panama	5 069	38 477	5 130	38 760	9 345	8 000	-	-
Paraguay	105	53 715	170	86 200	-	-	-	-
Peru	-	132 984	-	294 400	-	-	-	8 000j)
Surinam	81	1 511	100	4 225	-	-	-	-
Venezuela	12 040	259 637	-	339 000	9 522	-	k)	k)

a) Kg. of Malathion 50%. In addition 17,069 Kg. of Malathion, 1,728 Kg. of Carbaril and 785 Kg. of BHC were used. In 1977, 70,000 Kg. of Malathion and 20,000 Kg. of Carbaril will be used. b) Information up to October. c) Lt. of Fenthion. d) Kg. of Sumithion and in 1977, 350 Lt. of Fenthion will be used. e) Lt. of DDT. f) Kg. Malathion. In addtion, in 1976, 2,255 Lt. of Malathion ULV, 352 Kg. Dibron, 1,950 Kg. of Abate granules and 246 Lt. emulsion were used. g) Information up to November. h) Lt. of Malathion of 95%. i) Lt. of Abate. j) Kg. of BHC of 30%. k) In 1976, 1,796 Lt. of Malathion ULV, 2,862 Kg. of HCH, 46,852 Lt. of DDT, C.E., were used.

Table 12

COMPARATIVE RESULTS OF ACTIVE AND PASSIVE CASE DETECTION IN MALARIA PROGRAMS IN THE AMERICAS, 1976

Country or other political or administrative unit	Average number of evaluators	Active case detection			Passive case detection						Total	
		Blood slides			Average number of notification posts	Average of notification posts producing slides per month	Blood slides			Average of slides per month per productive notification posts	Blood slides	
		Examined	Positive	Percent			Examined	Positive	Percent		Examined	Positive
Argentina	70	37 016	52	0.1	305	97	10 594	18	0.2	9.1	47 610	70
Bahamas	-	-	-	-	-	-	...	1	-	-	...	1
Barbados	-	-	-	-	-	-	...	1	-	-	...	1
Belize	10	21 591	133	0.6	116	19	1 922	66	3.4	8.4	23 513	199
Bolivia	109	105 805	3 020	2.9	2 832	301	18 296	3 694	20.2	5.1	124 101	6 714
Brazil	4 242	1 878 619	22 782	1.2	30 433	13 296	724 893	67 177	9.3	4.5	2 603 512	89 959
Canada	-	-	-	-	-	-	...	86	-	-	...	86
Chile	-	-	-	-	-	-	...	1	-	-	...	1
Colombia	341	171 003	13 771	8.1	5 045	3 933	215 894	25 251	11.7	4.6	386 897	39 022
Costa Rica	78	169 253	362	0.2	888	46	2 500	111	4.4	4.5	171 753	473
Cuba	...	13 509	0	-	-	-	302 601	162	0.1	-	316 110	162
Dominican Republic	151	352 584	543	0.2	4 499	1 629	83 484	43	0.1	4.3	436 068	586
Ecuador	127	121 767	1 553	1.3	5 752	2 691	191 286	9 421	4.9	5.9	313 053	10 974
El Salvador	104	77 595	7 384	9.5	2 718	2 208	456 015	75 906	16.6	17.2	533 610	83 290
French Guiana	...	17 803	123	0.7	32	...	2 051	271	13.2	...	19 854	394
Grenada and Carriacou	-	-	-	-	-	-	30	0	-	-	30	0
Guatemala	153	206 138	2 529	1.2	5 932	2 638	228 959	7 087	3.1	7.2	435 097	9 616
Guyana	40	...	...	...	...	...	...	...	...	...	102 815	4 642
Haiti	58	135 087	3 258	2.4	6 439	3 544	245 047	11 829	4.8	5.8	380 184	15 087
Honduras	47	24 948	1 243	5.0	...	1 822	270 180	47 561	17.6	12.4	295 128	48 804
Jamaica	-	14 513	1	0.01	...	...	28	5	17.9	-	14 541	6
Mexico	796	1 373 634	7 307	0.5	59 959	5 813	376 144	10 846	2.9	5.4	1 749 778	18 153
Nicaragua	117	32 439	1 302	4.0	4 098	2 351	218 143	24 926	11.4	7.7	250 582	26 228
Panama	226	351 368	609	0.2	1 092	266	33 573	118	0.4	10.5	384 941	727
Paraguay	155	44 633	110	0.2	4 232	1 401	107 777	30	0.03	6.4	152 410	140
Peru	163	143 362	6 496	4.5	5 172	1 050	100 313	11 966	11.9	8.0	243 675	18 462
Puerto Rico	-	-	-	-	-	-	...	1	-	-	...	1
St. Lucia	-	110	0	-	-	-	21	1	4.8	-	131	1
Surinam	30	64 018	330	0.5	58	23	15 546	207	1.3	56.3	79 564	537
Trinidad and Tobago	-	1 131	-	-	-	-	9 743	3	0.03	-	10 874	3
United States of America	-	-	-	-	-	-	331	250	75.5	-	331	250
Venezuela	460	179 377	2 434	1.4	2 705	525	94 773	2 306	2.4	15.0	274 150	4 740
Zona del Canal	...	547	0	-	...	...	1 016	7	0.7	...	1 563	7
Total	-	5 537 850	75 342	1.4	-	-	3 711 160	299 352	8.1	-	9 351 875	379 336

Table 13

PERSONNEL EMPLOYED IN THE MALARIA PROGRAMS IN THE AMERICAS
31 DECEMBER 1975 AND 1976

(Part-time personnel in parentheses)

Title	1975	1976
Engineers	112	115
Spraying Chiefs	322	325
Sector Chiefs	621	537
Squad Chiefs	2 357 (38)	2 312 (38)a)
Spraymen	11 077 (111)	9 959 (111)a)
Draftsmen	100	107
Medical Officers	191 (3)	194
Entomologist	57	60
Assistant Entomologists	167	180
Statisticians and Statisticians' Assistants	438	408
Evaluation Inspectors	1 611	1 735
Evaluators	7 109	7 069
Microscopists	1 011	891
Administrators	74	73
Administrative Assistants	711	744
Accountants	44	58
Disbursing Officers	52	52
Storekeepers	87	83
Storekeepers' Assistants	77	75
Secretaries	253	284
Others	811	683
Transport Chiefs, Mechanics and Assistant Mechanics	448	467
Drivers	1 022	1 013
Motorboat Operators	409	306
Boatmen	95	90
TOTAL	29 256 (152)	27 820 (149)

a) In some programs this personnel performs epidemiological activities.

Table 14

MEANS OF TRANSPORT IN MALARIA PROGRAMS IN THE AMERICAS, 1976

Country or other political or administrative unit	Trucks (3 tons or more)		Trucks and "Pick-up" (less than 3 tons)		Jeeps		Automobiles and station wagons		Motor-cycles		Bicycles		Motor boats		Boats without motor		Saddle and pack animals	Other	
	a	b	a	b	a	b	a	b	a	b	a	b	a	b	a	b		a	b
Argentina	1	2	23	20	24	32	2	3	-	-	9	4	1	-	-	-	-	-	-
Belize	-	-	5	-	3	3	1	-	-	-	-	-	5	-	-	-	-	-	-
Bolivia	-	-	7	4	15	24	2	-	7	8	-	-	15	10	-	-	70	16 c)	35 c)
Brazil	44	-	268	-	787	-	8	-	8	-	474	-	353	-	7	-	865	-	-
Colombia	3	11	43	55	73	108	27	6	20	18	140	86	155	60	30	8	983	-	-
Costa Rica	1	-	10	1	19	1	2	-	58	12	30	11	39	12	-	-	35	-	-
Dominican Republic	1	-	41	11	2	-	7	-	141	-	-	-	-	-	-	-	66	-	-
Ecuador	1	1	16	20	26	21	5	3	45	11	23	-	41	15	-	-	268	-	-
El Salvador	-	-	8	14	11	11	3	-	14	4	-	-	-	-	-	-	-	-	-
French Guiana	-	1	3	-	1	-	3	4	-	-	-	-	-	-	2	1	-	-	-
Guatemala	-	2	49	5	31	7	20	-	69	15	5	-	24	3	4	3	-	-	-
Guyana	-	-	-	-	8	6	-	-	5	-	-	-	6	2	3	2	6	-	-
Haiti	-	-	10	49	1	42	6	9	-	-	-	-	-	1	1	-	-	-	-
Honduras	1	1	23	6	21	5	8	2	8	9	-	-	1	1	-	-	66	-	-
Mexico	22	8	336	205	440	211	25	3	-	-	-	-	36	11	-	-	1 917	-	-
Nicaragua	1	1	26	2	30	1	35	4	19	-	-	-	12	12	-	-	-	-	-
Panama	-	1	19	8	10	12	1	3	2	23	15	9	1	-	41	5	-	41 c)	54 c)
Paraguay	1	1	23	5	5	-	15	-	141	46	38	12	21	-	-	-	-	26 c)	15 c)
Peru	3	-	27	13	5	10	7	20	20	12	20	43	-	-	-	-	-	-	-
Surinam	-	1	-	1	1	1	-	-	4	-	-	-	-	-	-	-	-	-	-
Venezuela	12	-	146	-	123	-	40	-	18	-	321	-	138	-	-	-	715	90 d)	-
Total	91	30	1 083	419	1 636	495	217	57	579	158	1 075	165	848	127	88	19	4 991	173	104

a) In good working conditions. b) In bad working conditons. c) Out-board motors. d) Fogging machines and equipment for ULV.

Table 15

NATIONAL EXPENDITURES 1975-1976 AND BUDGET 1977 FOR THE MALARIA PROGRAMS IN THE AMERICAS

(In U.S. dollars)

Country or other political or administrative unit	National Expenditures 1975			Estimated National Expenditures 1976			National Budget 1977		
	Internal financing	Loans	Total	Internal financing	Loans	Total	Internal financing	Loans	Total
Argentina	134 925	-	134 925	404 899	-	404 899	634 316	-	634 316
Belize	75 595	-	75 595	93 625	-	93 625	118 124	-	118 124
Bolivia	509 133	-	509 133	618 492	-	618 492	780 197	-	780 197
Brazil	31 036 991	-	31 036 991	36 262 822	-	36 262 822	40 130 293	-	40 130 293
Colombia	3 508 757	-	3 508 757	3 877 909	-	3 877 909	4 393 939	-	4 393 939
Costa Rica a)	815 376	-	815 376	969 792	-	969 792	1 090 281	-	1 090 281
Dominican Republic b)	779 580	-	779 580	779 580	-	779 580	779 580	-	779 580
Ecuador	1 667 247	331 492	1 998 739	2 693 152	-	2 693 152	3 535 911	-	3 535 911
El Salvador	2 508 037	-	2 508 037	3 121 200	-	3 121 200	2 723 028	-	2 723 028
French Guiana	1 284 847	-	1 284 847	1 284 847	-	1 284 847	...	-	...
Guatemala	2 627 411	-	2 627 411	2 798 630	-	2 798 630	3 064 686	-	3 064 686
Guyana	119 184	-	119 184	121 568	-	121 568	156 863	-	156 863
Haiti	300 000	-	300 000	500 000	-	500 000	660 000	-	660 000
Honduras	997 416	-	997 416	1 001 746	-	1 001 746	...	-	...
Mexico	14 183 079	-	14 183 079	17 273 245	-	17 273 245	25 637 049	-	25 637 049
Nicaragua	2 612 857	-	2 612 857	2 962 143	-	2 962 143	2 883 857	-	2 883 857
Panama b)	1 665 777	-	1 665 777	1 742 366	-	1 742 366	1 781 375	-	1 781 375
Paraguay b)	1 037 865	-	1 037 865	1 127 892	-	1 127 892	1 587 301	-	1 587 301
Peru	1 454 226	-	1 454 226	1 482 837	-	1 482 837	3 008 596	-	3 008 596
Surinam	228 333	380 555	608 888	203 283	390 555	593 838	232 778	413 333	646 111
Venezuela c)	13 465 470	-	13 465 470	13 300 306	-	13 300 306	14 968 478	-	14 968 478
Total	81 012 106	712 047	81 724 153	92 620 334	390 555	93 010 889	108 166 652	413 333	108 579 985

a) Information up to October 1976. b) Information up to November 1976. c) Information up to September 1976.

Table 16

ESTIMATED REQUIREMENTS FOR MALARIA PROGRAMS
IN THE AMERICAS

	1976[a]	1977[b]	1978[b]	1979[b]
TOTAL COST	96 483 062	111 743 345	-	-
GOV. AND OTHER SOURCES	94 016 510	109 779 985	...	...
PAHO/WHO PORTIONS:				
Personnel costs and travel	2 069 009	1 514 860	1 600 550	1 657 075
Supplies and equipment ..	305 464	316 740	259 410	268 845
Fellowships	41 644	52 360	43 365	24 480
Grants and others	50 435	79 400	15 500	15 700
TOTAL	2 466 552	1 963 360	1 918 825	1 966 100

SOURCES OF PAHO/WHO FUNDINGS

SOURCE	1976[a]	1977[b]	1978[b]	1979[b]
PAHO-Reg.....	1 374 952	1 098 695	1 188 225	1 160 600
PAHO-PG.....	29 386	122 260	-	-
OMS-Reg.....	1 062 214	742 405	730 600	805 500
TOTAL	2 466 552	1 963 360	1 918 825	1 966 100

PAHO/WHO PERSONNEL

CATEGORY	1976[a]	1977[b]	1978[b]	1979[b]
Medical Officers.....	19	16	16	16
Sanitary Engineers.....	7	6	6	5
Entomologists.....	3	4	4	4
Parasitologists.....	1	1	1	1
Sanitary Inspectors.....	11	8	8	8
Other	6	5	5	5
TOTAL	47	40	40	39

a) Expenses
b) Estimated requirements

Table 17

INTERNATIONAL CONTRIBUTIONS TO MALARIA PROGRAMS IN THE AMERICAS
1976 AND ESTIMATED 1977

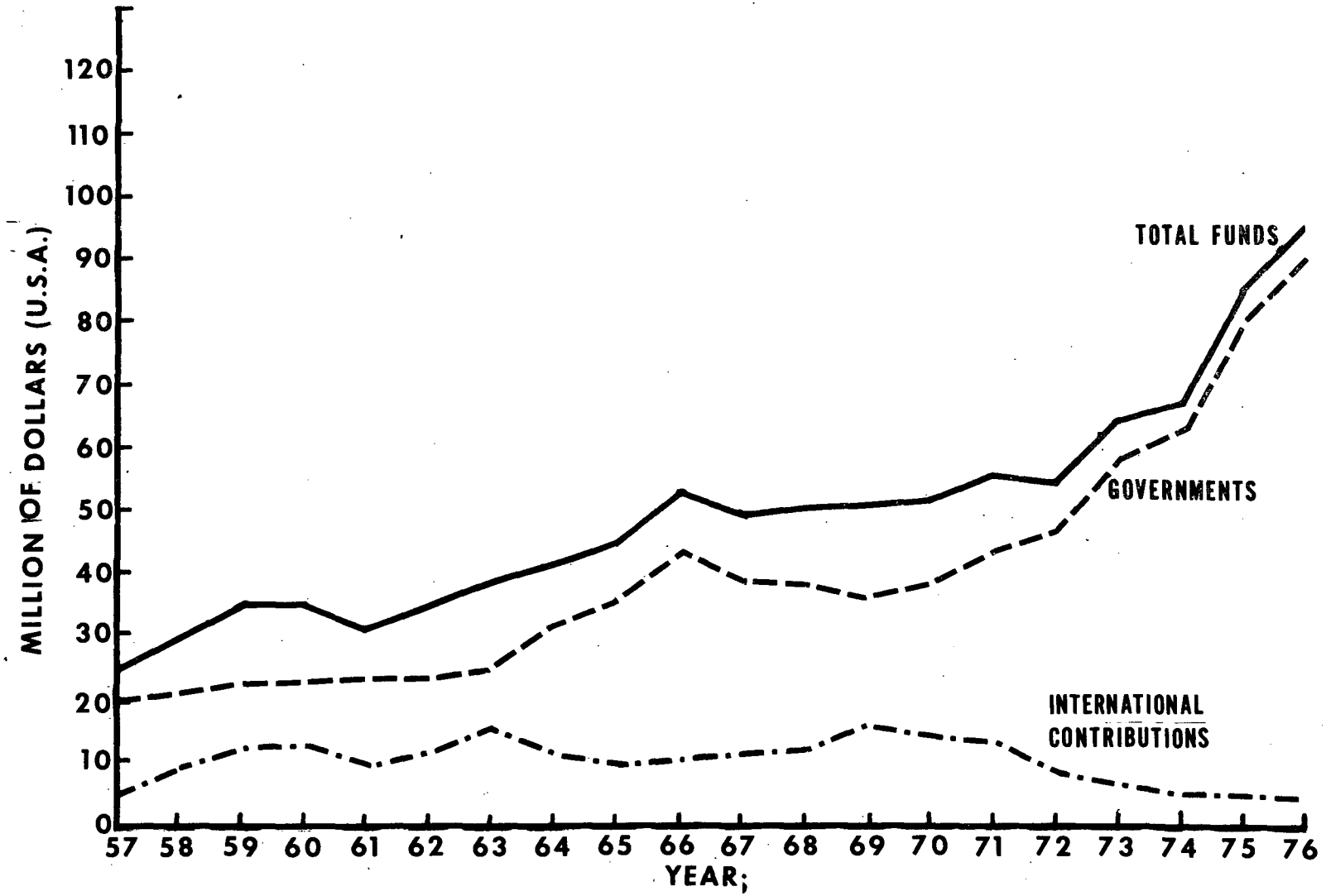
(U.S. dollars)

Country or other political or administrative unit	Date of initiation of total coverage	1976			1977 (estimated)		
		PAHO	WHO and WHO/TA	AID (USA) (fiscal year)[a]	PAHO	WHO and WHO/TA	AID (USA) (fiscal year)[a]
Argentina	Aug. 1959	1 229	-	-	-	8 470	-
Belize	Feb. 1957	35 910	-	-	-	29 630	-
Bolivia	Sep. 1958	49 911	-	-	48 935	-	-
Brazil	Aug. 1959	214 430	53 656	-	260 740	-	-
Colombia	Sep. 1958	201 797	-	-	50 275	180 710	-
Costa Rica	Jul. 1957	6 339	31 267	-	-	53 970	-
Dominican Republic	Jun. 1958	47 814	-	-	41 665	-	-
Ecuador	Mar. 1957	121 764	-	-	-	-	-
El Salvador	Jul. 1956	6 429	76 148	-	-	77 700	-
French Guiana	Sep. 1963	2 473	-	-	6 440	-	-
Guatemala	Aug. 1956	24 048	25 296	-	-	-	-
Guyana	Jan. 1947	54 319	-	-	-	49 970	-
Haiti	Jan. 1962	216 778	-	1 005 621	194 680	-	1 200 000
Honduras	Jul. 1959	-	12 355	-	-	-	-
Mexico	Jan. 1957	76 746	35 653	-	126 330	-	-
Nicaragua	Nov. 1958	62 449	51 707	-	41 475	47 310	-
Panama	Aug. 1957	33 902	106 390	-	-	79 355	-
Paraguay	Oct. 1957	39 741	-	-	-	47 850	-
Peru	Nov. 1957	54 747	-	-	65 095	-	-
Surinam	May. 1958	-	40 797	-	-	45 355	-
Inter-country projects, Headquarters		153 512	628 945	-	385 320	122 085	-
Total		1 404 338	1 062 214	1 005 621	1 220 955	742 405	1 200 000

a) AID loans shown in Table 15

Graph 1

FUNDS INVESTED IN THE MALARIA PROGRAMS IN THE AMERICAS, 1957-1976



Graph 2

INTERNATIONAL FUNDS INVESTED IN THE MALARIA PROGRAMS IN THE AMERICAS, 1957-1976

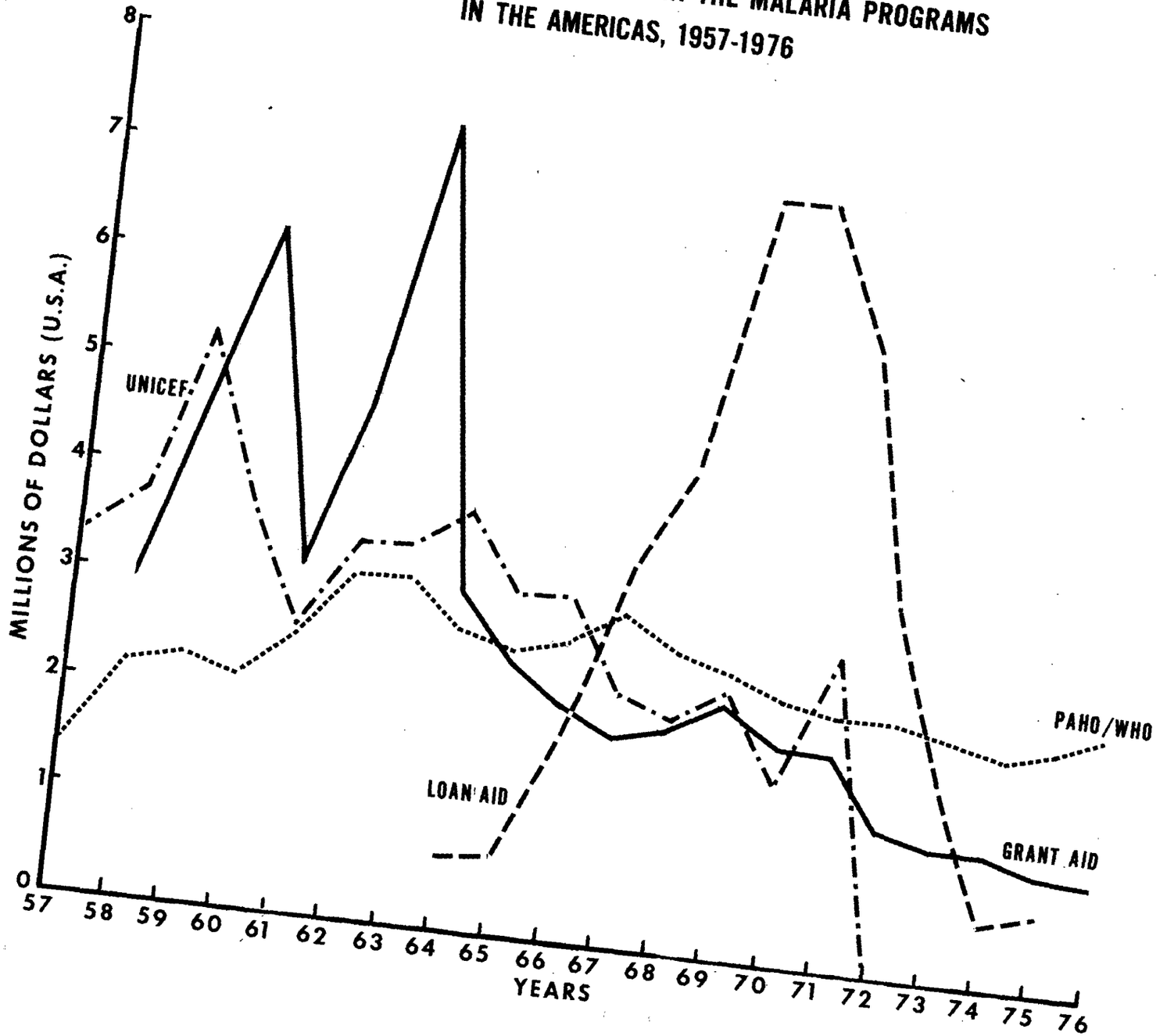


Table 18

GEOGRAPHICAL DISTRIBUTION OF AREAS WITH TECHNICAL PROBLEMS, 1976

Countries and Areas	Population of Affected Areas	Area Involved (Km^2)	Insecticides Used		Principal Vectors	Causes of the Problem
			Type Used	Years of Coverage		
Colombia						
1. Caribbean Coastal Zone; Magdalena River, Pacific Coastal Zone, Catatumbo Eastern Slope of Eastern Mountains, Alto Caqueta, Sarare	765 900	105 923	DDT	10-17	A. darlingi A. punctimac. A. nuñeztovari A. albimanus A. pseudopun. A. neivae A. albitarsis	Vector behavior; poor housing; colonization; social problems; parasite resistance to chloroquine; refusal to spraying; movement of people.
Ecuador						
2. Esmeraldas 3. Napo	297 778	40 583	DDT	9	A. punctimac. A. albimanus	Colonization; poor housing.
El Salvador						
4. Coastal Area	953 228	7 689	DDT Propoxur	17 6	A. albimanus	Vector resistance to DDT and Propoxur.
Guatemala						
5. Pacific Coastal Zone; Eastern Central Zone; Northern Zone	1 445 295	36 981	DDT Propoxur	17 6	A. albimanus A. pseudopunc. A. vestitipen.	Vector resistance to DDT and Propoxur; colonization.
Haiti						
6. Cité Simone O. Duvalier; Jackmel; Valle de la Coma; Gross-Morne; Southeast area; Petit-Goâve; Bois Neuf	478 052	3 645	DDT	12	A. albimanus	Vector resistance to DDT; movement of people.
Honduras						
7. Area Sur Valle de Jamastran; Valles de Talanga y Cedros	692 244	5 436	DDT DLN Propoxur	8 2 3	A. albimanus A. pseudopunc.	Vector resistance to DDT, DLN internal and external migration
Mexico						
8. Basins of Rivers Fuerte Sinaloa, Humaya and Tamazula; 9. Huicot 10. Basin of Balsas River 11. Costa Chica of Guerrero and Oaxaca Coastal Zone 12. "El Istmo" Northeastern Slope of the Golf of Mexico, Oaxaca State 13. Tapachula-Suchiate 14. Central part of Chiapas	3 028 752	162 547	DDT	19	A. pseudopun. A. albimanus	Internal migration; poor housing; temporary shelters; modification of houses; vector resistance to DDT; actions that remove insecticides from surfaces.

Table 18

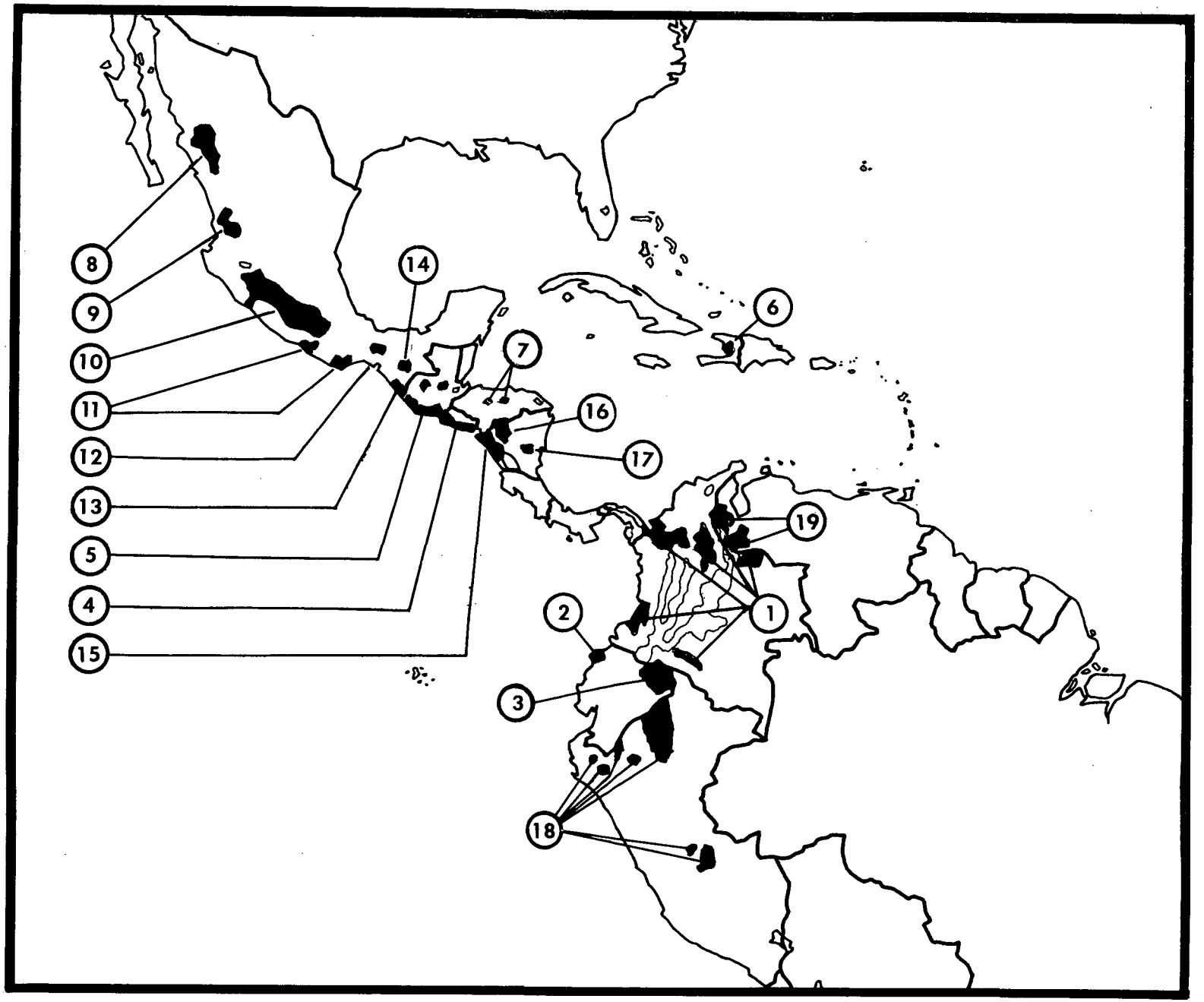
GEOGRAPHICAL DISTRIBUTION OF AREAS WITH TECHNICAL PROBLEMS, 1976 (Cont'd)

Countries and Areas	Population of Affected Areas	Area Involved (Km^2)	Insecticides Used		Principal Vectors	Causes of the Problem
			Type Used	Years of Coverage		
Nicaragua						
15. Pacific Coast; 16. Central Region; 17. Atlantic Region, Zelaya	1 728 786	30 138	DDT Malathion Propoxur	16 5 6½	A. albimanus	Vector resistance to DDT, Malathion and Propoxur.
Peru						
18. Chinchipe Ene Satigo San Lorenzo Bigote Bagua Bajo Marañón	176 020	2 225	DDT	14-19	A. pseudopunc. A. rangeli A. albimanus A. benarrochi	High vulnerability; poor housing; migration of laborers; temporary shelters; actions that remove insecticides from surfaces.
Venezuela						
19. Western Area	432 635	19 738	DDT	25	A. nuñeztovari A. darlingi	Vector exophily; population movement; colonization; refusal to permit spraying poor public cooperation.
TOTAL	9 998 690	414 945				

Note: In the Americas, also exist regions with all types of problems of special characteristics, such as the Amazon Basin which includes areas of Bolivia, Colombia, Ecuador, Peru and a large extension of Brazil; in this 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 a long term program.

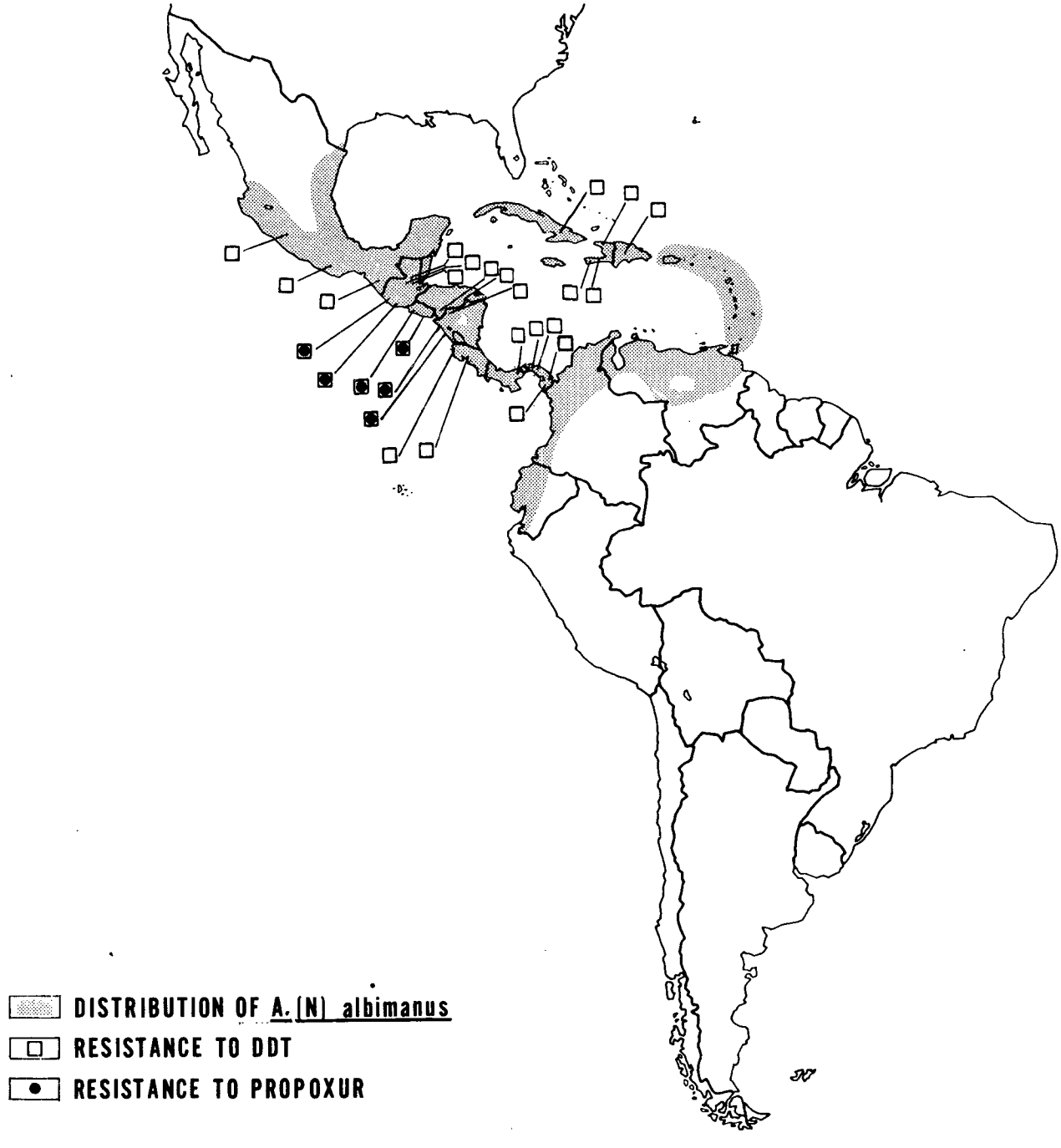
Map 3

GEOGRAPHICAL DISTRIBUTION OF AREAS OF TECHNICAL PROBLEMS



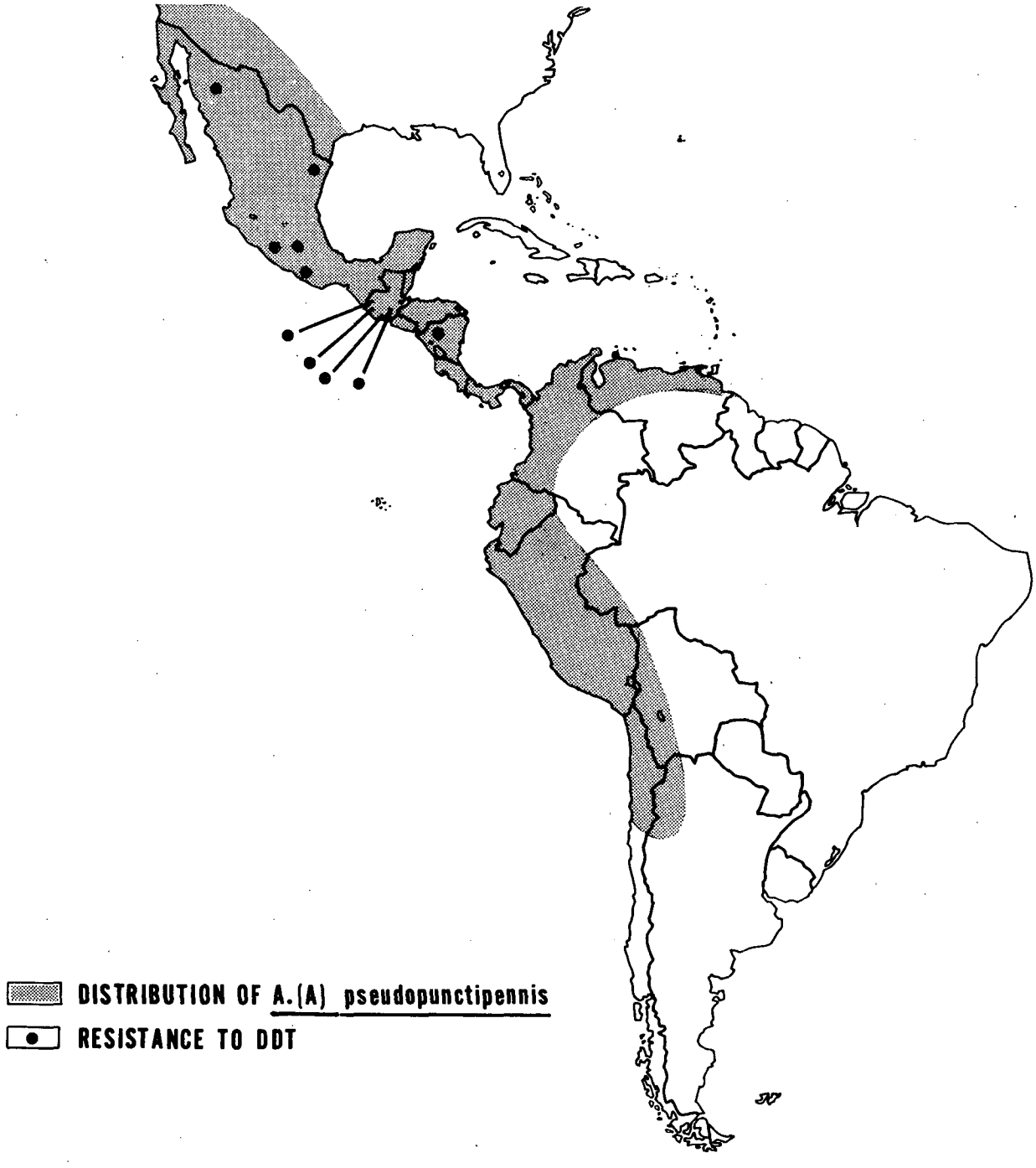
Map 4

DISTRIBUTION OF A. (N) albimanus AND RESISTANCE TO DDT AND PROPOXUR (DECEMBER 1976)



Map 5

DISTRIBUTION OF A. (A) pseudopunctipennis AND RESISTANCE TO DDT (DECEMBER 1976)



AREAS WITH CONFIRMED CASES OF P. falciparum RESISTANT TO CHLOROQUINE, 1976

Map 6

No.	Country and Area
	BRAZIL
1	Barcelos (Amazonas)
2	Pto. Velho (Rondonia)
3	R. Machado (Rondonia)
4	Cuiaba (Mato Grosso)
5	Três Lagoas (Mato Grosso)
6	Conceição da Barra (Esp. Santo)
7	Alenquer (Pará)
8	Santarém (Pará)
9	S. Miguel Guama (Pará)
10	Belém (Pará)
11	Igarapemirim (Pará)
12	Barcarena (Pará)
13	Carretera Belém-Brasilia (Pará)
14	R. Gurupi (Pará)
15	Braz Aguiar (Roraima)
16	Mucajaí (Roraima)
17	Boa Vista (Roraima)
18	Macapá (Amapá)
	COLOMBIA
19	Curiche (Chocó)
20	Río de Oro (Cesar)
21	Caucasia (Antioquia)
22	Cimitarra y Bolívar (Santander)
23	Pto. Boyacá (Boyacá)
	ECUADOR
24	Putumayo (Napo)
	FRENCH GUIANA
25	Bellevue (Iracoubo)
	GUYANA
26	Lethem
	PANAMA
27	Las Cumbres y Chilibre Lago Gatún San Blas Garachiné-Sambú
	SURINAM
28	Alalaparoe
29	Lawa y Marowijne rivers
	VENEZUELA
30	Barinas
31	Zulia
32	T. F. Delta Amacuro
33	T. F. Amazonas

Table 19

DRUGS PROVIDED BY PAHO/WHO TO THE MALARIA PROGRAMS IN THE AMERICAS, 1958-1976

(In thousands of tablets)

Country or other political or administrative unit	Total 1958-1975[a]								1976					
	Chloroquine 150 mg.	Primaquine 15 mg.	Primaquine 5 gm.	Pyrimethamine 25 mg.	Combined drug (b)	Aspirin 0.50	Aspirin 0.20	Fanasil	Chloroquine 150	Primaquine 15 gm.	Primaquine 5 gm.	Chlorothamine 25 mg.	Combined drug (b)	Fanasil
Argentina	2 018	399	222	712	-	-	-	-	-	-	-	-	-	-
Belize	603	82	107	6	22	61	79	-	50	-	-	-	-	-
Bolivia	9 820	1 475	691	860	670	200	-	14	350	45	-	100	-	1
Brazil	133 535	2 174	1 079	345	2 487	-	-	296	1 800	500	300	51	338	76
Canal Zone	-	-	-	-	90	-	-	-	-	-	-	-	-	-
Colombia	33 395	2 683	830	6 649	11 592	100	20	502	500	35	-	-	235	-
Costa Rica	7 294	1 203	517	213	1 385	227	81	-	500	50	30	10	-	-
Cuba	4 350	38	69	80	-	-	-	-	-	-	-	-	-	-
Dominica	90	1	1	45	-	40	-	-	-	-	-	-	-	-
Dominican Republic	14 230	91	225	847	306	10	10	-	47	-	-	-	100	-
Ecuador	14 936	1 156	271	430	1 013	-	-	-	150	57	-	-	-	-
El Salvador	20 405	982	923	128	2 070	-	-	-	450	47	15	-	-	-
French Guiana	458	293	47	46	48	-	-	10	150	150	20	30	-	2
Grenada	43	-	-	45	-	20	-	-	-	-	-	-	-	-
Guatemala	18 733	1 292	391	127	8 049	200	50	2	865	105	75	-	-	-
Guyana	987	269	99	338	-	30	-	25	170	28	10	40	-	-
Haiti	13 170	102	5	1 480	31 608	-	-	-	730	-	-	-	-	-
Honduras	16 071	2 164	1 310	88	1 290	-	-	-	715	-	16	-	-	-
Jamaica	879	18	-	288	50	-	-	-	-	-	-	-	-	-
Mexico	81 916	11 236	15 372	10 679	6 452[c]	-	-	-	2 000	550	-	-	490[c]	-
Nicaragua	13 849	2 678	2 155	156	6 933	-	-	-	550	175	-	-	-	-
Panama	6 780	1 046	583	462	1 787	-	-	58	-	-	12	43	120	3
Paraguay	12 312	256	118	74	76	-	-	14	422	15	-	3	18	-
Peru	25 456	1 689	758	2 823	4 089	433	40	-	350	-	-	500	-	-
St. Lucia	68	1	-	70	-	36	-	-	-	-	-	-	-	-
Surinam	3 405	689	313	886	265	128	10	15	100	20	-	30	20	-
Trinidad and Tobago	840	961	426	127	400	112	20	-	-	-	-	-	-	-
Total	435 643	32 978	26 512	28 004	80 682	1 597	310	936	9 899	1 777	478	807	1 321	82

a) During this period, Chloroquine, Pyrimethamine and Primaquine powder and Tricalcium phosphate have been provided to different malaria projects. b) Chloroquine/Primaquine combined (adult and infant sizes). c) Includes Daraclor tablets (Chloroquine/Pyrimethamine combined).

Table 20

PAHO/WHO TECHNICAL STAFF ASSIGNED TO MALARIA PROGRAMS IN THE AMERICAS
FROM 1974 TO 1977

Country or other political or administrative unit	Medical Officers				Sanitary Engineers				Sanitary Inspectors				Entomologists				Others			
	1974	1975	1976	1977	1974	1975	1976	1977	1974	1975	1976	1977	1974	1975	1976	1977	1974	1975	1976	1977
Belize	-	-	-	-	-	-	-	-	1	1	1	1	-	-	-	-	-	-	-	-
Bolivia	1	1	1	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Brazil	3	3	2	2	1	2	1	1	-	-	-	-	-	-	-	-	3a)	2b)	1c)	1c)
Colombia	1	1	1	1	-	-	-	-	2	3	2	2	1	1	1	1	-	-	-	-
Costa Rica	1	1	1	1	-	-	-	-	-	-	-	-	-	-	-	-	1c)	1c)	-	-
Dominican Republic	-	-	-	-	-	-	1	1	1	1	-	-	-	-	-	-	-	-	-	-
Ecuador	1	1	1	-	-	-	-	-	2	2	2	-	-	-	-	-	-	-	-	-
El Salvador	1	1	1	1	1	1	-	-	1	1	1	1	1	1	1	-	-	-	-	-
El Salvador-0201	1	1	-	-	-	-	-	-	2	2	-	-	2	2	-	-	-	-	-	-
Guatemala	-	1	-	-	1	1	-	-	-	-	-	-	-	-	-	-	1d)	1d)	-	-
Guyana	-	-	1	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Haiti	1	-	1	1	-	-	1	1	1	3	3	3	-	-	-	-	-	2e)	-	-
Honduras	1	1	-	-	-	-	-	-	1	1	-	-	-	-	-	-	-	-	-	-
Mexico	1	1	1	1	1	1	1	1	-	-	-	-	-	-	-	-	-	-	-	-
Nicaragua	1	1	1	1	-	-	1	1	-	1	-	-	-	-	-	-	-	-	-	-
Panama	-	-	-	-	1	1	1	1	1	1	1	-	1	1	1	1	-	-	-	-
Paraguay	1	1	1	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Peru	1	1	1	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Surinam	-	-	-	-	-	-	-	-	-	1	1	1	-	-	-	-	-	-	-	-
Headquarters and AMRO Projects	6	5	6	5	1	1	1	-	-	-	-	-	-	-	-	1	1f	1f	-	-
Total	21	20	19	17	6	7	7	6	12	17	11	8	5	5	3	3	6	7	1	1

a) One parasitologist, one assistant engineer and one laboratory adviser. b) One parasitologist and one laboratory adviser.
c) Parasitologist. d) Administrative methods officer. e) Epidemiologists. f) Economist.

Table 21

HEALTH ACTIVITIES CARRIED OUT BY MALARIA PROGRAMS

Country	Malaria	*Aedes aegypti*	Dengue	Chagas	Filariasis including Onchocerciasis	Leishmaniasis	Other
Argentina	x	-	-	-	-	-	-
Belize	x	-	-	-	-	-	-
Bolivia	x	-	-	-	-	-	-
Brazil	x	-	-	-	-	-	-
Colombia	x	x	-	-	-	-	Immunization, Yaws
Costa Rica	x	x	-	x	x	x	-
Dominican Republic	x	x	x	-	-	-	-
Ecuador	x	x	-	x	-	-	Immunization, Yaws, Family planning
El Salvador	x	-	-	-	-	-	-
Frecnh Guiana	x	-	-	-	-	-	-
Guatemala	x	x	-	-	x	-	-
Guyana	x	x	-	-	-	-	-
Haiti	x	x	x	-	x	-	Immunization
Honduras	x	x	-	-	-	-	-
Mexico	x	-	-	-	-	-	-
Nicaragua	x	x	-	-	-	-	-
Panama	x	x	-	-	-	-	Vector control
Paraguay	x	-	-	-	-	-	Survey on Schistosomiasis
Peru	x	-	-	x	-	-	Vector control
Surinam	x	-	-	x	-	-	-

Table 22

LABORATORIES AND MICROSCOPISTS OF MALARIA PROGRAMS IN THE AMERICAS, 1977

Country or territory	No. Laboratories	Microscopists				Sex		Ages					Time in Service				Academic Background			
		Superv. or Chief	Senior Mic.	Mic.	Total	M	F	≤20	21-30	31-40	41-50	>50	1-5	6-10	10-20	>20	Prim.	Junior School	High School	College
Argentina	14	1	-	17	18	4	14	-	1	2	8	7	1	1	6	10	11	7	-	-
Belize	1	-	-	2	2	2	-	-	1	1	-	-	1	-	1	-	-	2	-	-
Bolivia	6	1	1	12	14	5	9	1	8	3	1	1	10	1	3	-	-	-	14	-
Brazil	110	7	31	222	260a)	108	135	3	78	108	39	15	87	48	98	26	24	208	20	8
Brazil S.P.	26	-	-	-	33	19	25	-	7	6	11	9	4	4	17	8	-	-	-	-
Colombia	19	-	8	-	33	2	31	-	12	13	6	-	6	10	14	3	2	23	8	0
Costa Rica	1	1	2	10	13	11	2	-	1	7	5	-	3	-	8	2	-	5	7	1
Cuba	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Dominican Republic	7	3	4	26	33b)	12	20	-	12	14	6	-	12	10	11	-	-	14	19	-
Ecuador	15	1	5	24	30	6	24	-	6	14	8	2	4	8	15	3	2	18	8	1
El Salvador	2	1	4	23	28	7	21	-	6	9	3	2	1	8	10	1	-	13	11	4
French Guiana	1	-	-	2	2c)	2	-	-	1	-	-	1	-	-	-	-	-	-	-	-
Guatemala	7	2	2	25	29	7	22	1	11	7	8	2	9	9	11	-	28	1	-	-
Guyana	7	1	-	12	13d)	11	2	-	7	4	1	1	-	-	-	-	-	13	-	-
Haiti	4	4	4	23	31	11	20	-	17	11	3	-	18	2	10	1	-	28	3	-
Honduras	5	5	3	16	24	1	23	2	11	9	1	-	10	8	6	-	-	24	-	-
Jamaica	1	1	-	5	6	1	4	1	3	-	1	1	4	-	2	-	-	-	-	-
Mexico	82	2	8	133	143e)	112	31	-	83	46	11	3	52	65	18	7	-	139	2	2
Nicaragua	11	1	1	21	23	17	6	-	10	9	4	-	9	8	5	1	2	15	6	-
Panama	8	1	2	18	20	14	6	-	12	3	3	2	8	7	2	3	1	3	16	-
Paraguay	7	2	1	10	13	9	4	-	2	5	3	3	-	4	7	2	1	7	4	1
Peru	9	1	4	19	24	14	10	-	2	12	9	1	3	-	17	4	3	18	2	1
Surinam	1	1	-	5	6f)	3	3	-	-	-	-	-	3	3	-	-	-	5	1	-
Venezuela	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...

a) 17 persons without information on age and sex and 1 person without information on time in service. b) 1 microscopist without indication of age and sex. c) Information on time in service and academic background not given. d) Time in service not specified. e) 1 microscopist without specification of time in service. f) Age not specified.

... No information available.

Map 7

GEOGRAPHICAL DISTRIBUTION OF THE LABORATORIES FOR MICROSCOPIC DIAGNOSIS OF MALARIA IN THE AMERICAS, 1977

* Information for Cuba and Venezuela not available.

Table 23

SCHISTOSOMIASIS CONTROL PROGRAM (S. Mansoni)
1976

Country or territory	Program level	Budget assigned to Program (USA$)	Principal control measures used in the program			Population exposed (Estimated)	Patients treated	
							in hospitals	outside hospitals
Brazil	National	4 071 661	Chemotherapy	Molluscicides	Sanitation	30 457 000	-	7 704
Dominican Republic	National	70 000	-	Molluscicides	Sanitation	279 282	29[a)]	-
Martinique	Regional	...	...	...	...	...	...	...
Puerto Rico	Regional	616 884	-	Molluscicides	Sanitation	2 079 184	20[a)]	-
Sta. Lucia	Nacional	60 903	Chemotherapy	Molluscicides	Sanitation	...	...	...
Surinam	Regional	(b)	Chemotherapy	Molluscicides	Sanitation	8 608	-	855[a)]
Venezuela	Dif. levels	877 276	Chemotherapy	Molluscicides	Sanitation	4 000 000	5[e)]	813[a)]

... No information.
a) Patients treated in 1975; no information available in 1976.
b) There is no specific Government financial allocation for the program.
c) Patients treated in 1974; (last available figure)