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STATUS OF MALARIA ERADICATION IN THE AMERICAS

XVIII REPORT

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REPORT ON THE STATUS OF MALARIA ERADICATION IN THE AMERICAS

XVIII REPORT

Introduction

The Director of the Pan American Sanitary Bureau has the honor to present to the XVIII Pan American Sanitary Conference the XVIII Report on the Status of Malaria Eradication in the Americas.

A coordinated campaign for the eradication of malaria from the Hemisphere was proposed by the XIV Pan American Sanitary Conference held in Santiago, Chile in 1954 and this concept was accepted as a world-wide objective in 1955 by the Eight World Health Assembly in Mexico City, Mexico. The application of attack measures using residual house spraying with insecticides was launched between 1956-1959 in all countries in the Americas where malaria had been a problem. While beneficial results have been achieved in all countries, progress of work to attain eradication has been variable. In some countries, malaria eradication has been achieved, but malaria transmission continues to occur in parts, or in all of others. To solve various administrative, operational and technical problems that had affected normal progress in some programs, the Second Meeting of the PAHO Advisory Committee on Malaria Eradication was held in Washington, D. C. during 3 to 5 March 1969. A careful analysis of every aspect of malaria eradication was made to seek new avenues for study and action not only in the field of malaria eradication, but also to determine its role as an integral part of the health sector and in the overall national economic development plan.

The delay in the achievement of the final objective in some countries in the Americas, as well as in other parts of the world, was also reflected in the deliberations and actions by the World Health Assembly in their 20th and 21st Meetings. Needs for re-examination of the global strategy of malaria eradication were stressed and the Director-General of WHO was requested to study how best to carry out such procedures. At the 22nd World Health Assembly which was held in Boston, Massachusetts, U. S. A., in July 1969, the Director-General of WHO presented a report on "Re-examination of the Global Strategy of Malaria Eradication" based on results of studies carried out in previous years in some countries in this Hemisphere, as well as in those of other parts of the world. Subsequently, the Assembly adopted a resolution: "... that the Governments of the countries with programs under way revise them in cooperation with the Organization and the other assisting agencies with a view to adapt them to a strategy calculated to give optimum results..." The proposed new strategy is searching for practical means to assist countries in more precisely designing a plan of action in accordance with their specific epidemiological, economic, social and health organizational characteristics.

The resolution, indeed, made the year of 1969 very significant in that it reaffirmed the objective of global malaria eradication and proposed concepts for the development of the strategy for the future.

The status of Malaria Eradication in the Americas is presented in four chapters. The first contains information on the general status of the program and country-by-country summaries of progress. The second describes special technical problems which have arisen and the measures being applied in the various programs to combat them. The third summarizes research currently in progress aimed at finding new or improved methods of overcoming technical problems and improving the effectiveness of the basic operations of malaria eradication programs. The fourth refers to international and bilateral assistance and cooperation provided to the programs.

Data presented are taken from answers to an annual questionnaire received from each country and from periodic statistical reports submitted to the Pan American Sanitary Bureau by most of the programs. The above is supplemented by data from special technical reports of research projects.

I. STATUS OF MALARIA ERADICATION PROGRAMS

A. General Picture

Of the 491,483,000 inhabitants that constitute the population of the Americas, 176,325,000 (36%) live in the originally malarious areas distributed among 34 political units (23 countries and 11 territories). Of the latter population, 119,744,000 (67.9%) reside in the areas in consolidation and maintenance phases, leaving 56,375,000 persons (32.0%) in the areas in attack phase located among 21 political units (in part or in the whole of 18 countries and 3 territories) as of the end of December 1969. Because of certain problems related to civil unrest, a small area in South America with 206,000 persons (0.1%) continues to have no protection from malaria infection.

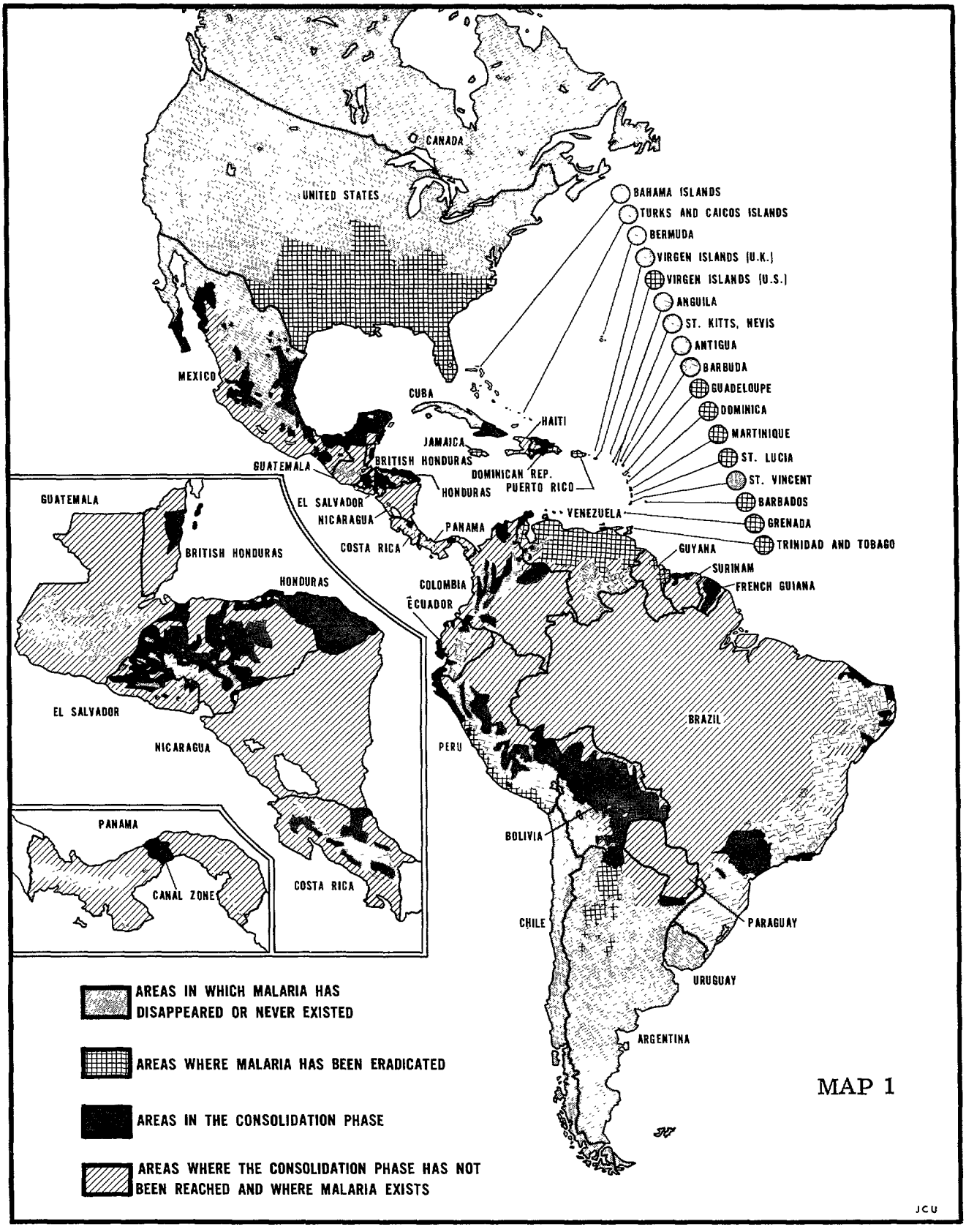
Of the 176,325,000 inhabitants living in the originally malarious areas, 58,603,000 reside in countries where malaria eradication had been achieved with or without specific efforts prior to the initiation of the coordinated malaria eradication campaign in 1957, (Countries or territories where malaria eradication had been achieved before 1957 include Chile, United States of America, Puerto Rico, Virgin Islands USA, and Martinique). Thus, of the 117,722,000 now living in countries where active malaria eradication programs have been undertaken, some 52 per cent live in areas where transmission has been interrupted and virtually all of the remainder received some degree of protection.

Maps 1 and 2 show the geographical extension according to the different phases of the program as of December 1968 and 1969. Table 1 depicts the population and area by phase in the countries with active malaria eradication programs after 1957. As can be seen in Table 1, there was a reduction in the originally malarious area in 1969 in comparison with that in 1968, and also a slight decrease in extent of areas in consolidation and maintenance phases. The over-all reduction in the originally malarious areas is due to the withdrawal of Barbados from the malarious area upon the claim of the Government and changes in Brazil, Cuba, Honduras and French Guiana resulting from a reappraisal of the extent of the originally malarious area. Thus, there has been a reclassification of some areas previously classified as in maintenance phase to non-malarious areas .On the other hand, there was a net gain of 0.4 per cent in the population figures for the areas in consolidation and maintenance phases in 1969 in relation to 1968.

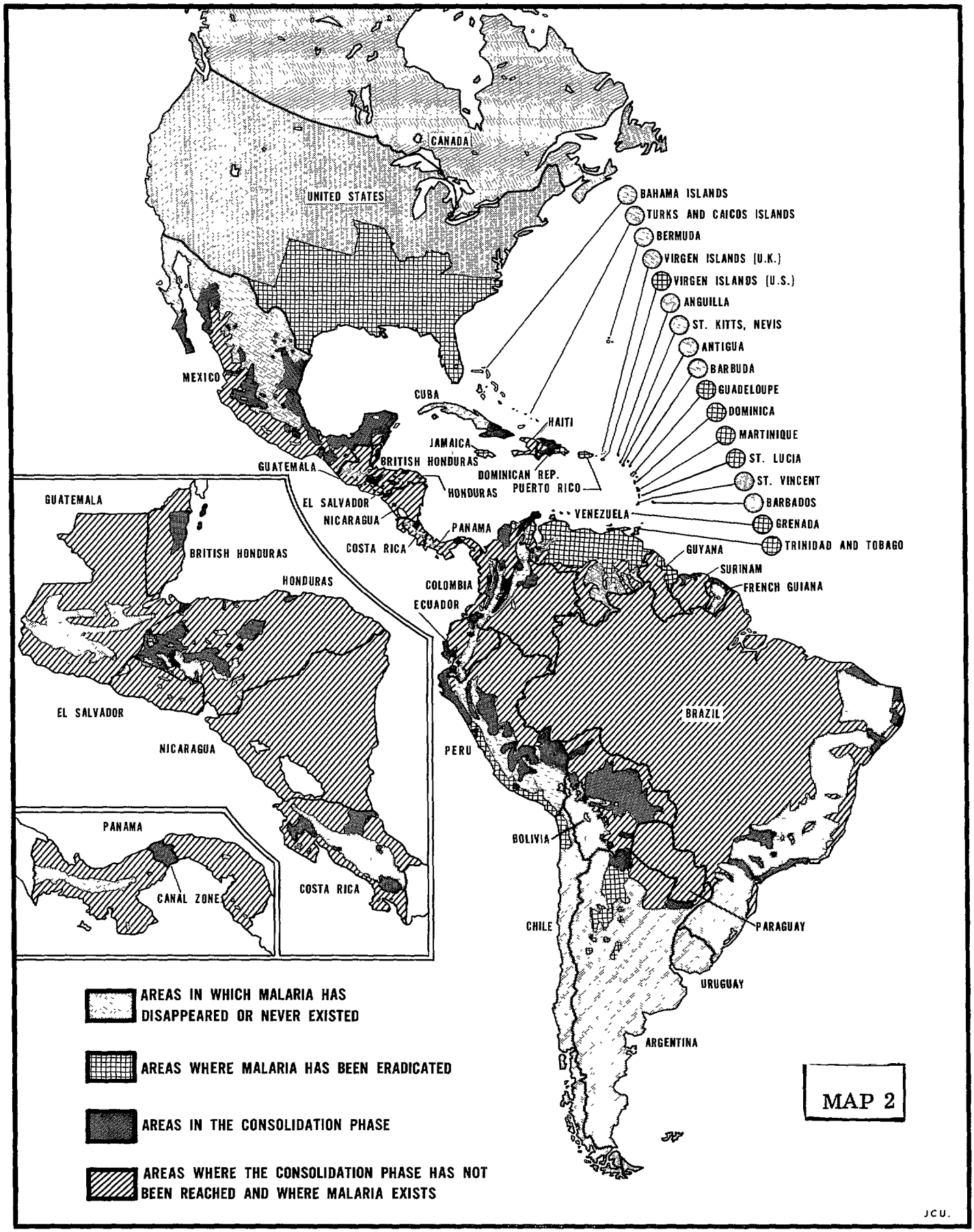
Table 1

COMPARISON OF 1968 AND 1969 POPULATION AND AREA BY PHASE IN COUNTRIES WITH PROGRAMS ACTIVE AFTER 1957

Phase	1968		1969	
	Total	%	Total	%
A. Population in thousands:				
1. Maintenance phase	14 059	12.1	14 154	12.0
2. Consolidation phase	45 812	39.4	46 987	39.9
3. Attack phase	56 234	48.3	56 375	47.9
4. Preparatory phase or not yet started	217	0.2	206	0.2
Total	116 322	100.0	117 722	100.0
B. Area in Km^2:				
1. Maintenance phase	720 832	5.4	720 392	5.4
2. Consolidation phase	2 112 056	15.9	1 876 563	14.1
3. Attack phase	10 444 843	78.4	10 667 988	80.3
4. Preparatory phase or not yet started	47 000	0.3	24 626	0.2
Total	13 324 731	100.0	13 289 569	100.0



STATUS OF THE MALARIA ERADICATION PROGRAM IN THE AMERICAS, 31 DECEMBER 1968



STATUS OF THE MALARIA ERADICATION PROGRAM IN THE AMERICAS, 31 DECEMBER 1969

Table 2 shows the evolution of the malaria eradication programs in the Americas by phase and year since the initiation of the coordinated campaign. The population living in the areas in consolidation and maintenance phases increased by 1.5 million in 1969 as compared to 1968.

Table 2

EVOLUTION OF MALARIA ERADICATION IN THE AMERICAS, BY PHASE 1958-1969

(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

Table 3 summarizes the present status of eradication in all countries and territories included in the originally malarious areas, in relation to past achievements and future prospects of eradicating malaria under existing conditions.

Considering the Continent by its regions, North America is entirely in the maintenance phase. Upon the request of the Government of the United States of America, however, PAHO with collaboration of CDC/USPHS prepared a report which is to be presented to the next Meeting of the Expert Committee on Malaria (Oct. 1970) for certification of the United States, Puerto Rico and the Virgin Islands as having achieved malaria eradication before 1957. The registration of these areas, having a population of 67,598,000, will make a total of 11 political units in this Hemisphere (4 countries and 7 territores) in which malaria eradication is certified by PAHO/WHO.

Middle America consists of Mexico, Panama and the countries of the Caribbean and Central America. In Central America, all five countries continued in 1969 their second year program of a coordinate 3-year plan. There was a further reduction in malaria incidence in Costa Rica and El Salvador, but an increase was observed in Honduras and Nicaragua. Guatemala maintained its 1968 status. British Honduras was approaching the end point of malaria transmission, while Mexico showed slight deterioration. Panama initiated its 3-year plan in July 1969. In the Caribbean area, malaria transmission continued only in Haiti and in an adjacent area in Dominican Republic. In the other countries and territories of Middle America, malaria free status was maintained satisfactorily.

Table 3

TENTATIVE CLASSIFICATION OF THE MALARIA ERADICATION PROGRAMS IN RELATION TO PROSPECT OF ERRADICATION AND COUNTRIES OR TERRITORIES WHERE ERADICATION HAS ALREADY BEEN ACHIEVED, 1969

(Population in thousands)

Country or other political unit	Eradication achieved	Good prospect of eradication			Not making satisfactory progress		
		Early eradication quite sure	Early eradication, if current progress continues	Some administrative and/or operational problems, but making progress	Progress dependent upon receiving funds	Serious administrative and/or operational problems	Progress dependent upon funds and new attack measures to solve tech. problems
Argentina	1 648	-	-	1 339	-	-	-
Bolivia	-	-	-	-	1 529	-	-
Brazil	804	-	29 817	-	-	5 000	-
Chile	159	-	-	-	-	-	-
Colombia	-	-	8 580	-	-	3 183	700
Costa Rica	-	-	520	-	-	-	-
Cuba	-	2 805	-	-	-	-	-
Dominican Republic	212	3 930	-	-	-	-	-
Ecuador	-	-	-	-	-	3 030	-
El Salvador	-	-	-	-	-	-	2 913
Guatemala	-	-	-	-	-	-	2 292
Guyana	678	45	-	-	-	-	-
Haiti	-	-	-	-	-	3 580	-
Honduras	-	-	-	-	-	-	2 113
Jamaica	1 530	-	-	-	-	-	-
Mexico	-	-	-	-	19 139	-	3 617
Nicaragua	-	-	-	-	-	-	1 872
Panama	-	-	1 360	-	-	-	-
Paraguay	-	-	1 922	-	-	-	-
Peru	1 133	-	-	-	3 457	-	-
Trinidad and Tobago	970	-	-	-	-	-	-
United States	55 692	-	-	-	-	-	-
Venezuela	6 711	-	-	-	-	169	230
British Honduras	-	122	-	-	-	-	-
Canal Zone	-	50	-	-	-	-	-
Dominica	18	-	-	-	-	-	-
French Guiana	25	-	19	-	-	-	-
Grenada	36	-	-	-	-	-	-
Guadeloupe	293	-	-	-	-	-	-
Martinique	207	-	-	-	-	-	-
Puerto Rico	2 487	-	-	-	-	-	-
St. Lucia	96	-	-	-	-	-	-
Surinam	-	-	-	235	-	-	-
Virgin Islands (U. S.)	58	-	-	-	-	-	-
Total	72 757	6 952	42 218	1 574	24 125	14 962	13 737
%	41. 3	4. 0	23. 9	0. 9	13. 7	8. 5	7. 8

In South America, Argentina, Guyana, and Paraguay made considerable progress during the year, and show good prospect of achieving malaria eradication within a short period of time. In Brazil and Surinam, a marked reduction of malaria incidence was observed in 1969, while the rest of the countries showed a slight increase in the number of malaria cases. The present status of malaria eradication by the three regions is showed in Graph 1 by phase and by region in terms of population.

B. Current Extent of the Problem

Table 4 gives the global information on number of slides examined and number of malaria cases found since 1958. The increase in number of cases in 1969 over 1968 is primarily due to problems in Ecuador, Colombia, Honduras, and Mexico as described elsewhere.

Table 4

SUMMARY OF CASE DETECTION IN THE AMERICAS, 1958-1969

Year	Number of slides examined	Number of slides found positive	Per cent positive
1958	1 716 103	56 705	3.3
1959	2 749 117	75 612	2.8
1960	3 955 149	79 998	2.0
1961	5 341 004	99 539	1.9
1962	7 221 367	177 089	2.4
1963	7 903 156	227 026	2.9
1964	8 156 290	254 572	3.1
1965	9 069 950	241 462	2.7
1966	11 731 451	333 245	2.9
1967	11 609 226	369 341	3.2
1968	12 522 696	282 773	2.3
1969	12 261 178	323 314	2.7

Table 5 gives the number and distribution of blood slides examined and positives detected in each country by program phase. During the year, 12,161,178 blood slides were examined and 323,314 malaria cases found in the Americas.

In the area in maintenance phase, which involves 14 political units with 72,757,000 inhabitants, 4,113 malaria cases were reported during the year, of which 120 were autochthonous. Of these, the United States had 80.7 per cent of the total malaria cases reported, none of which was classified as autochthonous. Venezuela had 86.7 per cent of all autochthonous cases (Table 6).

The area in consolidation phase includes a part or all of 16 political units with a population of 46,987,000. In this area, 3,865,186 blood smears were examined during the year with 21,120 positive for malaria parasites, giving an Annual Blood Examination Rate (ABER) of 8.2 per cent and an Annual Parasite Incidence (API) of 0.45 per 1,000 inhabitants, respectively. However, the API for the cases originating in the areas (autochthonous and introduced) is 0.1 per 1,000. Of the 11,727 cases epidemiologically investigated 4,028 were autochthonous (34.3%), 129 introduced (1.1%) and the rest (64.6%) imported, induced and relapses (Table 7).

In the area in attack phase, 7,544,771 blood slides were examined of which 296,064 were found to be positive for malaria parasites, giving a slide positivity rate of 3.9 per cent. The Annual Blood Examination Rate (ABER) is 13.4 per cent, and the Annual Parasite Incidence (API) 5.3 per 1,000 inhabitants. In addition, there were 339,663 blood slides examined and 2,020 cases found in non-malarious area which are assumed to have their origin in the attack phase area. Of the malaria cases found in the Attack and non-malarious areas, P. falciparum infections represent 26.9 per cent, P. vivax 73.0 per cent, and P. malariae 0.1 per cent of the total (Tables 5 and 8).

Graph 1

STATUS OF MALARIA ERADICATION IN THE AMERICAS, BY REGION, 1969

POPULATION BY PHASE AS A PERCENTAGE OF ORIGINALLY MALARIOUS AREA

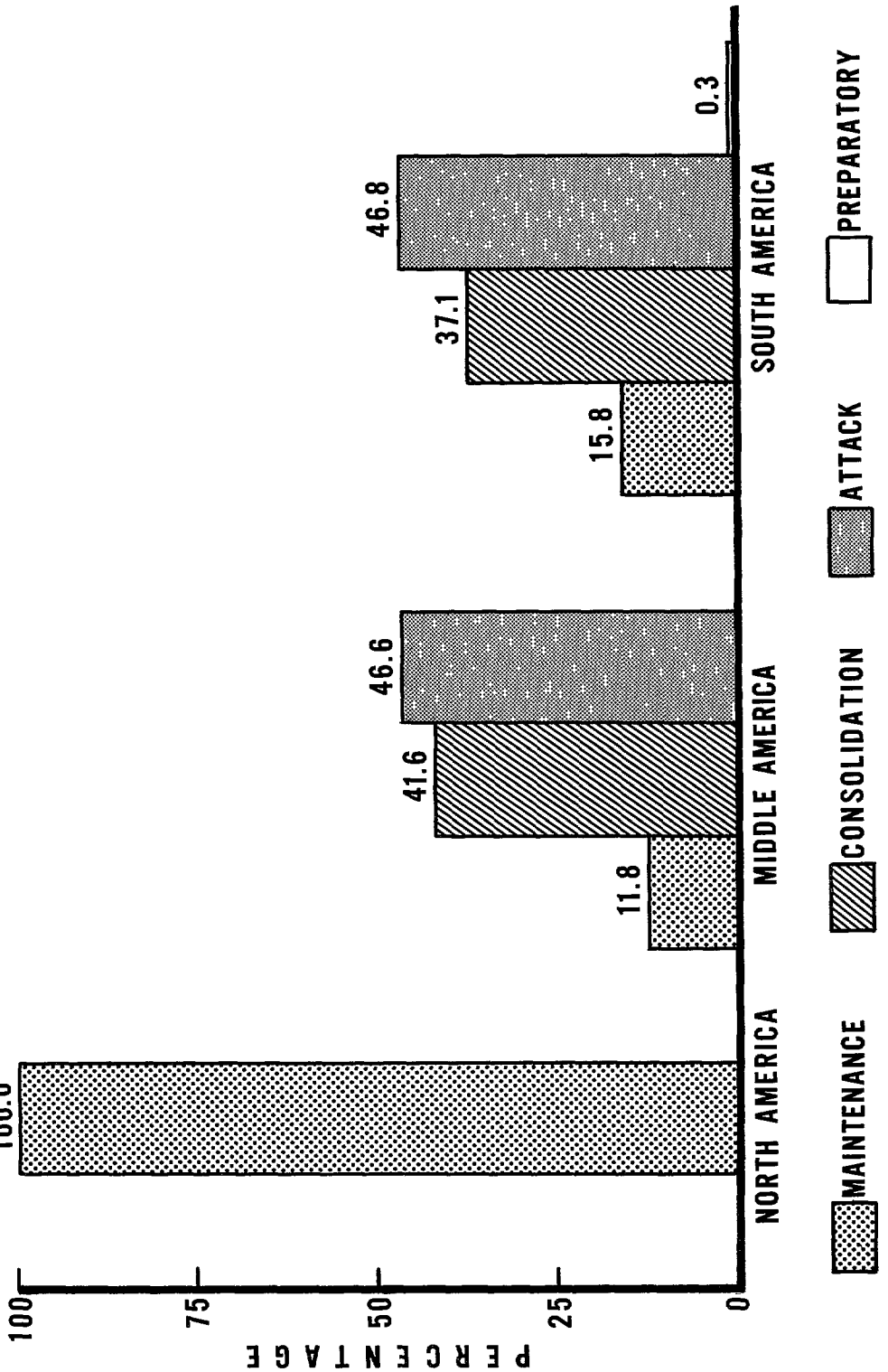


Table 5

CASE DETECTION BY COUNTRY AND PHASE OF PROGRAM, 1969

Country or other political unit	Total		Attack phase		Consolidation phase		Maintenance phase		Non-malarious areas	
	Slides examined	Positive cases	Slides examined	Positive cases	Slides examined	Positive cases	Slides examined	Positive cases	Slides examined	Positive cases
Argentina	159 178	247	40 027	69	41 693	165	77 458	13	-	-
Bolivia[a]	167 287	3 957	119 108	2 980	47 662	933	-	-	517	44
Brazil	2 139 885	56 951	1 366 430	55 503	693 280	773	21 495	5	58 680	670
Colombia	767 866	39 435	344 925	33 938	416 280	5 100	-	-	6 661	397
Costa Rica	202 362	688	170 498	631	31 572	9	-	-	292	48
Cuba	746 827	3	-	-	506 846	-	-	-	239 981	3
Dominican Republic	629 695	124	178 177	105	395 013	11	56 360	8	145	0
Ecuador	421 650	50 957	256 852	44 038	164 798	6 919	-	-	-	-
El Salvador	858 916	25 299	858 916	25 299	-	-	-	-	-	-
Guatemala	521 336	10 494	516 264	10 329	-	-	-	-	5 072	165
Guyana	70 121	25	47 966	18	-	-	22 155	7	-	-
Haiti	686 167	5 005	686 167	5 005	-	-	-	-	-	-
Honduras	591 544	29 584	431 719	28 306	158 649	1 266	-	-	1 176	12
Jamaica	54 227	0	-	-	-	-	54 227	0	-	-
Mexico	2 524 060	52 126	1 475 917	46 463	1 026 330	5 383	-	-	21 813	280
Nicaragua	498 119	16 043	498 119	16 043	-	-	-	-	-	-
Panama	94 596	5 938	94 596	5 938	-	-	-	-	-	-
Paraguay	129 509	10 307	128 927	10 246	-	-	-	-	582	61
Peru	263 344	3 168	143 047	2 849	94 647	309	25 645	9	5	1
Trinidad and Tobago	42 272	5	-	-	-	-	42 272	5	-	-
United States of America	1 572[b]	3 315	-	-	-	-	1 572	3 315	-	-
Venezuela	468 158	8 660	154 479	7 640	-	-	311 811	727	1 868	293
British Honduras	12 194	28	10 725	27	1 469	1	-	-	-	-
Canal Zone	31 876	158	-	-	31 876	158	-	-	-	-
Dominica	2 779	0	-	-	-	-	2 779	0	-	-
French Guiana	7 000	52	680	12	185	20	6 135	20	-	-
Grenada[c]	980	0	-	-	-	-	980	0	-	-
Guadeloupe	17 412	0	-	-	-	-	16 598	0	814	-
Puerto Rico	4	4	-	-	-	-	4	4	-	-
St. Lucia	12 048	0	-	-	-	-	12 048	0	-	-
Surinam	38 194	741	21 232	625	14 905	70	-	-	2 057	46
Total	12 161 178	323 314	7 544 771	296 064	3 625 205	21 117	651 539	4 113	339 663	2 020

a) November. b) Only those examined at NCDC. c) June.

Table 6

EPIDEMIOLOGICAL EVALUATION IN AREAS UNDER MAINTENANCE PHASE IN MALARIA ERADICATION PROGRAMS, 1969

Country or other political unit	Number of slides examined	Total No. of positive cases	Species of parasite			Origin of infections						
								Imported		Induced	Introduced	Unclassified or not investigated
			P. falciparum	P. vivax	P. malariae	Autochthonous	Relapsing	from abroad	from areas within country			
Argentina	77 458	13	-	13	-	1	-	1	3	-	7	1
Brazil	21 495	5	1	4	-	-	-	-	4	-	-	1[a]
Dominican Republic	56 360	8	8	-	-	-	-	-	8	-	-	-
Guyana	22 155	7	1	6	-	-	1	5	1	-	-	-
Jamaica	54 227	0	-	-	-	-	-	-	-	-	-	-
Peru	25 645	9	-	7	2	2	-	4	-	1	-	2
Trinidad and Tobago	42 272	5	3	-	2	-	-	5	-	-	-	-
United States of America [b]	1 576[c]	3 319[d]	479	2 640	28	-	-	3 318	-	-	-	1
Venezuela	311 811	727	77	647	3	104	12	151	341	3	114	2[a]
Dominica	2 779	0	-	-	-	-	-	-	-	-	-	-
French Guiana	6 135	20	4	16	-	13	2	-	5	-	-	-
Grenada and Carriacou	980[e]	0	-	-	-	-	-	-	-	-	-	-
Guadeloupe	17 412[f]	0	-	-	-	-	-	-	-	-	-	-
St. Lucia	12 048	0	-	-	-	-	-	-	-	-	-	-
Total	652 353	4 113	573	3 333	35	120	15	3 484	362	4	121	7

a) Cryptic case.
b) Including Puerto Rico and Virgin Islands.
c) Includes only those slides examined at NCDC.
d) Including 9 cases P.ovale, 76 mixed infections and 87 without species diagnosed.
e) January-June.
f) Including 814 slides taken in non-malarious areas.

Table 7

EPIDEMIOLOGICAL EVALUATION IN AREAS IN CONSOLIDATION PHASE IN MALARIA ERADICATION PROGRAMS, 1969

Country or other political unit	Population (thousands)	No. of slides examined	Total No. of positive cases	API Total (a)	API Local (b)	Species of parasite			Origin of infections						
						P. falciparum	P. vivax	P. malariae	Autochtonous	Relapsing	Imported		Induced	Introduced	Unclassified or not investigated
											from abroad	from areas within country			
Argentina	432	41 693	165	0.4	0.3	-	165	-	136	16	5	-	-	2	6
Bolivia	1 174	47 662	933	0.8	0.4	100	833	-	463	13	4	33	-	-	420
Brazil (Excl. São Paulo)	6 380	554 881	252	0.04	0.01	100	150	2	63	2	-	60	2	-	125
Brazil (São Paulo)	5 758	138 399	521	0.1	0.02	210	311	-	100	-	-	376	2	16	27
Colombia	8 580	416 280	5 100	0.6	0.05	2 855	2 245	-	457	-	37	3 302	5	8	1 291
Costa Rica	87	31 572	9	0.1	0.01	-	9	-	1	1	3	1	-	-	3
Cuba	2 805	746 827 c)	3 c)	0.0	0	-	3	-	-	1	1	-	1	-	-
Dominican Republic ...	3 443	395 013	11	0.0	0	2	-	9	2	8	-	-	1	-	-
Ecuador	1 294	164 798	6 919	5.3	0.4	468	6 451	-	479	40	1	2 567	2	88	3 742
Honduras	648	158 649	1 266	2.0	0.9	229	1 037	-	552	60	33	95	-	-	526
Mexico	13 817	1 026 330	5 383	0.4	0.1	3	5 367	13	1 511	281	1	374	5	11	3 200
Peru	2 256	94 647	309	0.1	0.08	-	308	1	180	9	2	93	-	-	25
British Honduras	49	1 469	1	0.02	0	-	1	-	-	-	-	1	-	-	-
Canal Zone	50	31 876	158	3.2	0.9	43	115	-	45	12	101	-	-	-	-
French Guiana	15	185	20	1.3	1.1	9	11	-	17	-	-	3	-	-	-
Surinam	199	14 905	70	0.4	0.1	68	2	-	22	1	-	15	-	4	28
Total	46 987	3 865 186	21 120	0.4	0.1	4 087	17 008	25	4 028	444	188	6 920	18	129	9 393

a) Total number of cases founded in the area, by 1 000 inhabitants. b) Number of cases originated in the areas (autochthonous and introduced), by 1 000 inhabitants.
c) Including 296 981 slides examined and the three cases from non-malarious areas.

Table 8

EPIDEMIOLOGICAL EVALUATION OPERATIONS IN ATTACK PHASE AND NON-MALARIOUS AREAS, 1969

Country or other political unit	Slides examined			Species found		
	Total	Positive		P. falciparum	P. vivax	P. malariae
		Number	Percentage			
Argentina	40 027	69	0.2	-	69	-
Bolivia[a]	119 625	3 024	2.5	716	2 308	-
Brazil	1 425 110	56 173	4.0	31 035	24 989	149
Colombia	351 586	34 335	9.8	21 237	13 081	17
Costa Rica	170 790	679	0.4	-	679	-
Dominican Republic	178 322	105	0.06	104	1	-
Ecuador	256 852	44 038	17.1	3 849	40 183	6
El Salvador	858 916	25 299	2.9	1 955	23 344	-
Guatemala	521 336	10 494	2.0	202	10 291	1
Guyana	47 966	18	0.04	14	4	-
Haiti	686 167	5 005	0.7	4 999	1	5
Honduras	432 895	28 318	6.5	5 144	23 174	-
Mexico	1 497 730	46 743	3.1	46	46 591	106
Nicaragua	498 119	16 043	3.2	2 673	13 370	-
Panama	94 596	5 938	6.3	4 106	1 832	-
Paraguay	129 509	10 307	8.0	1 591	8 716	-
Peru	143 052	2 850	2.0	22	2 791	37
Venezuela	156 347	7 933	5.1	1 821	6 046	66
British Honduras	10 725	27	0.3	-	27	-
French Guiana	680	12	1.8	7	5	-
Surinam	23 289	671	2.9	666	4	1
Total[b]	7 643 639	298 081	3.9	80 187	217 506	388

a) November.
b) Slides examined in Cuba and Guadeloupe from their non-malarious areas are not included in this table, as the two countries do not have area in attack phase. They are included in Tables 6 and 7.

There are 23 political units (19 countries and 4 territories) which have areas in attack and/or consolidation phase with a total population of 103,568,000. In analyzing the programs from technical, operational, administrative and financial view points, the total population can be grouped under 6 categories as shown in Table 9 in relation to their prospect of eradication.

Table 9

TENTATIVE CLASSIFICATION OF THE MALARIA PROGRAMS IN RELATION TO PROSPECT OF ERADICATION, 1969

Categories	Population (in thousands)	
	Total	%
Early eradication quite sure	6 952	6.7
Early eradication, if current progress continues	42 218	40.8
Some administrative and operational problems, but making progress	1 574	1.5
Progress dependent upon receiving funds	24 125	23.3
Serious administrative and operational problems	14 962	14.4
Progress dependent upon financial support and new attack measures to solve serious technical problems ...	13 737	13.3
Total	103 568	100.0

In Tables 10 and 11, the status of malaria eradication in each country is presented in terms of population and geographical extension by phase of program. In addition, the distribution of population in the originally malarious areas is illustrated in Graph 2 by phase of program. The progress and the present status of each malaria eradication program is briefly summarized in the following paragraphs. The statistical data indicating the results of the main malaria eradication activities are presented in the country tables. (Pages 35 to 119).

ARGENTINA

The malarious area in Argentina is confined to the northern part of the country and is the southern limit in the Americas where malaria transmission occurs. The vector, A. darlingi, is very responsive to DDT residual house spraying and malaria eradication is quite feasible with application of classic methods of attack. In the past, insufficient financing and inadequate administrative flexibility caused a series of difficulties in obtaining a sufficient spraying coverage. In addition, there was a problem of importation of malaria cases from Paraguay where the malaria eradication program was not initiated until the middle of 1968. However, with the improvement of financing in the last three years and the initiation of the program in Paraguay, the malaria situation in the area in attack phase (with 907,000 inhabitants) has been greatly improved; the number of malaria cases having been reduced from 1,512 cases in 1967 to 418 cases in 1968 and to only 69 cases in 1969. Of the latter, 18 were classified as relapses and 35 as imported from outside the country. Thus, malaria transmission is being interrupted in the area in attack phase.

A problem does exist, however, in maintaining adequate malaria surveillance or vigilance in the areas in consolidation (with 432,000 inhabitants) and in maintenance (with 1,468,000 inhabitants) phases. It has been the Government policy to integrate the surveillance or vigilance program in the general health activities. During the year, outbreaks were observed in limited foci of the area in consolidation phase with 136 autochthonous cases.

BOLIVIA

Considerable progress was achieved during the early stages of the program. Unfortunately, budgetary limitations during the past few years necessitated a reduction in field operations and resulted in increased transmission in both areas under attack and in consolidation. In 1969, the spraying cycles were incomplete. In November 1969, however, the Government declared malaria as a public health problem of national emergency, thus, hopefully assuring adequate financing in the future and the possible intensification of necessary field activities. Malaria eradication is feasible if adequate funds are made available.

BRAZIL

In 1967, the Federal Government established malaria eradication as a priority program and since then has continued its high degree of interest in the campaign. However, financial difficulties in the country obliged a reduction of 11.6 per cent of the 1969 malaria budget, and as a result the program completed only 80 per cent of the spraying coverage planned for that year. This budget reduction affected mainly the operations of the second semester and necessitated the establishment of priorities so as to minimize the impact of reduced operations on the gains achieved in the area in advanced stage of attack.

Chloroquine resistant strains of P. falciparum appear to be wide-spread in the country. There is no evidence of the malaria vectors having developed physiological resistance to the insecticide used (DDT). It seems realistic to assume that eradication is whithin sight in a great portion of the northeast and the eastern coast where some 80 per cent of the population of the malarious area in Brazil reside. However, some difficulties are expected in the south where malaria is transmitted by mosquitoes of the sub-genus Kerteszia. In the Amazon Region, some degree of progress has already been shown in relatively densily populated areas adjacent to the main rivers, but a new approach may be required to attack the problems in sparsely populated areas of the hinterland.

Table 10

STATUS OF MALARIA ERADICATION IN THE AMERICAS, BY POPULATION, 1969

(Population in thousands)

Country or other political unit	Total population	Population of originally malarious areas									
		Total		Malaria eradication claimed (maintenance phase)		Consolidation phase		Attack phase		Prep. phase or program not yet started	
		Total	%	Total	%	Total	%	Total	%	Total	%
Argentina	23 440[a]	2 987	12.7	1 648	55.2	432	14.5	907	30.3	-	-
Barbados	253[a]	-	-	-	-	-	-	-	-	-	-
Bolivia	4 822	1 529	31.7	-	-	1 174	76.8	355	23.2	-	-
Brazil	89 684	35 621[b]	39.7	804	2.2	12 138	34.1	22 679	63.7	-	-
Canada	21 007[a]	-	-	-	-	-	-	-	-	-	-
Chile	9 351[a]	159[c]	1.7	159[c]	100.0	-	-	-	-	-	-
Colombia	21 049	12 463	59.2	-	-	8 580	68.8	3 677	29.5	206	1.7
Costa Rica	1 705	520	30.5	-	-	87	16.7	433	83.3	-	-
Cuba	8 210	2 805	34.2	-	-	2 805	100.0	-	-	-	-
Dominican Republic	4 175	4 142	99.2	212	5.1	3 443	83.1	487	11.8	-	-
Ecuador	5 580	3 030	54.3	-	-	1 294	42.7	1 736	57.3	-	-
El Salvador	3 322	2 913	87.7	-	-	-	-	2 913	100.0	-	-
Guatemala	5 008	2 292	45.8	-	-	-	-	2 292	100.0	-	-
Guyana	723	723	100.0	678	93.8	-	-	45	6.2	-	-
Haiti	4 790	3 580	74.7	-	-	-	-	3 580	100.0	-	-
Honduras	2 421	2 113	87.3	-	-	648	30.7	1 465	69.3	-	-
Jamaica	1 913	1 530	80.0	1 530[d]	100.0	-	-	-	-	-	-
Mexico	45 860	22 756	49.6	-	-	13 817	60.7	8 939	39.3	-	-
Nicaragua	1 872	1 872	100.0	-	-	-	-	1 872	100.0	-	-
Panama	1 417	1 360	96.0	-	-	-	-	1 360	100.0	-	-
Paraguay	2 331	1922	82.5	-	-	-	-	1 922	100.0	-	-
Peru	13 172	4 590	34.8	1 133	24.7	2 256	49.1	1 201	26.2	-	-
Trinidad and Tobago	1 125	970	86.2	970[d]	100.0	-	-	-	-	-	-
United States of America	200 831	55 692	27.7	55 692	100.0	-	-	-	-	-	-
Uruguay	2 818[e]	-	-	-	-	-	-	-	-	-	-
Venezuela	9 550	7 110	74.5	6 711[f]	94.4	-	-	399	5.6	-	-
Antigua	62[a]	-	-	-	-	-	-	-	-	-	-
Bahamas	144[a]	-	-	-	-	-	-	-	-	-	-
Bermuda	52[a]	-	-	-	-	-	-	-	-	-	-
British Honduras	122	122	100.0	-	-	49	40.2	73	59.8	-	-
Canal Zone	50	50	100.0	-	-	50	100.0	-	-	-	-
Dominica	70	18	25.7	18[d]	100.0	-	-	-	-	-	-
Falkland Island	2	-	-	-	-	-	-	-	-	-	-
French Guiana	44	44	100.0	25	56.8	15	34.1	4	9.1	-	-
Grenada and Carriacou	106	36	34.0	36[d]	100.0	-	-	-	-	-	-
Guadeloupe	335	293	87.5	293	100.0	-	-	-	-	-	-
Martinique	333	207	62.2	207	100.0	-	-	-	-	-	-
Montserrat	15	-	-	-	-	-	-	-	-	-	-
Netherland Antilles	215[a]	-	-	-	-	-	-	-	-	-	-
Puerto Rico	2 799	2 487	88.8	2 487	100.0	-	-	-	-	-	-
St. Kitts, Nevis, Anguilla	61	-	-	-	-	-	-	-	-	-	-
St. Lucia	112	96	85.7	96[d]	100.0	-	-	-	-	-	-
St. Pierre and Miquelon	5	-	-	-	-	-	-	-	-	-	-
St. Vincent	95	-	-	-	-	-	-	-	-	-	-
Surinam	365	235	64.4	-	-	199	84.7	36	15.3	-	-
Virgin Islands (U. K.)	9[e]	-	-	-	-	-	-	-	-	-	-
Virgin Islands (U. S.)	58[e]	58	100.0	58	100.0	-	-	-	-	-	-
Total	491 483	176 325	35.9	72 757	41.3	46 987	26.6	56 375	32.0	206	0.1

a) Population and Vital Statistics Report, United Nations, Oct. 1969. b) The decrease is due to a reappraisal of the extent of the malarious area. c) 1967 figures. d) Population in areas where eradication of malaria has been certified by PAHO. e) 1968 figures. f) Includes an area with 5 014 502 inhabitants where eradication of malaria has been certified by PAHO.

Table 11

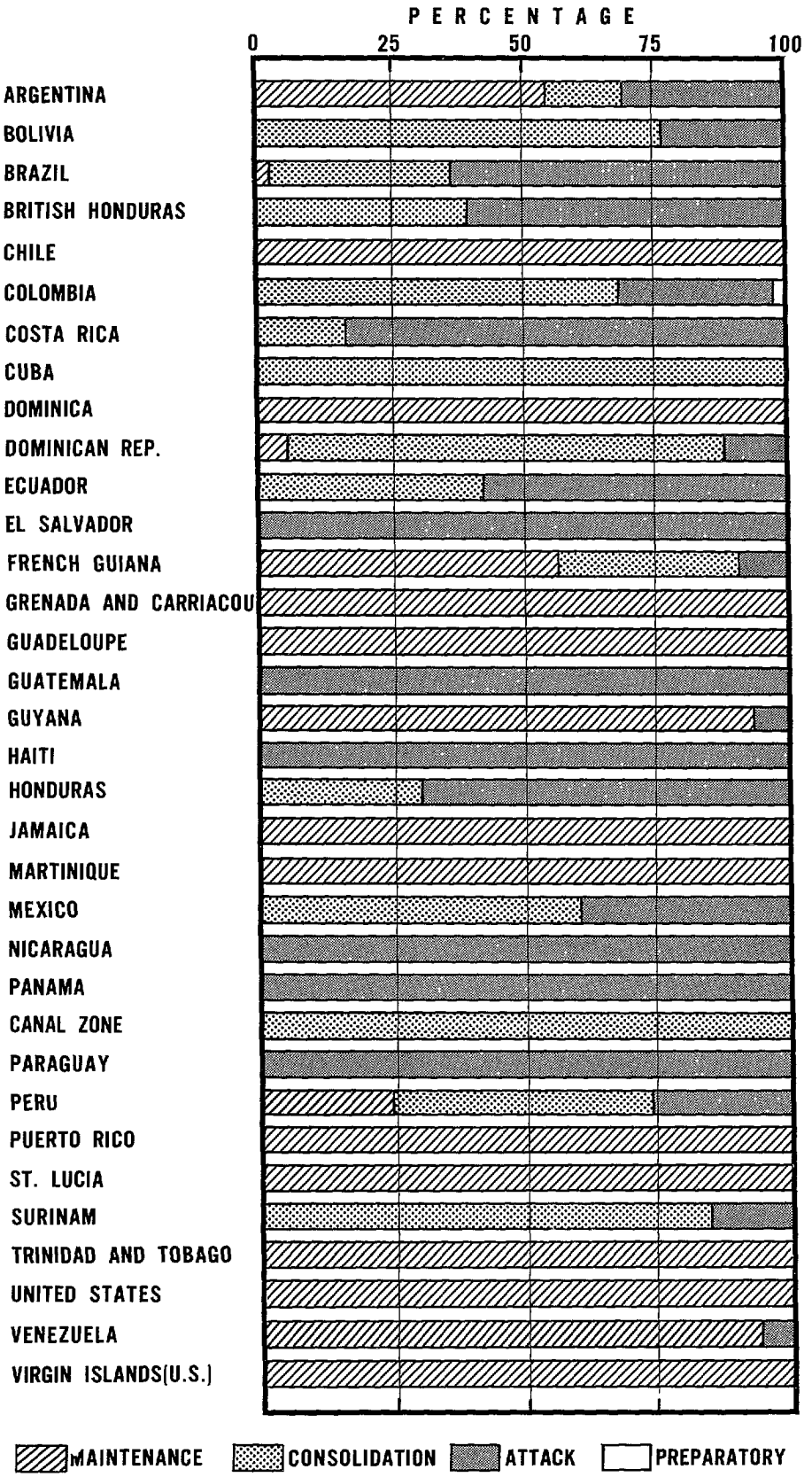
STATUS OF MALARIA ERADICATION IN THE AMERICAS, BY AREA, 1969
(Area in Km^2)

Country or other political unit	Total area	Originally malarious areas									
		Total		Malaria eradication claimed (maintenance phase)		Consolidation phase		Attack phase		Prep. phase or program not yet started	
		Total	%	Total	%	Total	%	Total	%	Total	%
Argentina	4 024 458	349 051	8.7	111 661	32.0	79 624	22.8	157 766	45.2	-	-
Barbados	430	-	-	-	-	-	-	-	-	-	-
Bolivia	1 098 581	821 346	74.8	-	-	424 364	51.7	396 982	48.3	-	-
Brazil	8 511 965	6 886 784[a]	81.0	1 056	0.01	169 719	2.5	6 716 009	97.5	-	-
Canada	9 221 016	-	-	-	-	-	-	-	-	-	-
Chile	741 767	55 287	7.5	55 287	100.0	-	-	-	-	-	-
Colombia	1 138 914	970 849	85.2	-	-	114 832	11.8	831 391	85.7	24 626	2.5
Costa Rica	50 900	35 446	69.6	-	-	8 451	23.8	26 995	76.2	-	-
Cuba	110 422	35 801	32.4	-	-	35 801	100.0	-	-	-	-
Dominican Republic	48 442	47 562	98.2	4 909	10.3	33 394	70.2	9 259	19.5	-	-
Ecuador	291 906	175 462	60.1	-	-	27 797	15.8	147 665	84.2	-	-
El Salvador	21 149	19 300	91.3	-	-	-	-	19 300	100.0	-	-
Guatemala	108 889	80 350	73.8	-	-	-	-	80 350	100.0	-	-
Guyana	215 025	215 025	100.0	39 437	18.3	-	-	175 588	81.7	-	-
Haiti	27 750	19 100	68.8	-	-	-	-	19 100	100.0	-	-
Honduras	112 088	101 351	90.4	-	-	16 855	16.6	84 496	83.4	-	-
Jamaica	11 428	10 028	87.7	10 028	100.0	-	-	-	-	-	-
Mexico	1 967 183	1 150 000	58.5	-	-	575 767	50.1	574 233	49.9	-	-
Nicaragua	127 358	118 358	92.9	-	-	-	-	118 358	100.0	-	-
Panama	75 650	69 840	92.3	-	-	-	-	69 840	100.0	-	-
Paraguay	406 752	406 552	99.9	-	-	-	-	406 552	100.0	-	-
Peru	1 285 216	961 172	74.8	84 497	8.8	327 685	34.1	548 990	57.1	-	-
Trinidad and Tobago	5 605	5 444	97.1	5 444	100.0	-	-	-	-	-	-
United States of America	9 359 781	2 309 601	24.7	2 309 601	100.0	-	-	-	-	-	-
Uruguay	186 926	-	-	-	-	-	-	-	-	-	
Venezuela	912 050	600 000	65.8	461 259	76.9	-	-	138 741	23.1	-	-
Antigua	280	-	-	-	-	-	-	-	-	-	-
Bahamas	11 396	-	-	-	-	-	-	-	-	-	
Bermuda	53	-	-	-	-	-	-	-	-	-	-
British Honduras	22 965	22 965	100.0	-	-	4 307	18.8	18 658	81.2	-	-
Canal Zone	1 432	1 432	100.0	-	-	1 432	100.0	-	-	-	-
Dominica	751	152	20.2	152	100.0	-	-	-	-	-	-
Falkland Island	11 961	-	-	-	-	-	-	-	-	-	-
French Guiana	90 000	20 700	23.0	200	0.09	7 500	36.2	13 000	62.8	-	-
Grenada and Carriacou	342	103	30.1	103	100.0	-	-	-	-	-	-
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	8 896	8 896	100.0	8 896	100.0	-	-	-	-	-	-
St.Kitts, Nevis, Anguilla	396	-	-	-	-	-	-	-	-	-	-
St. Lucia	603	510	84.6	510	100.0	-	-	-	-	-	-
St. Pierre and Miquelon	240	-	-	-	-	-	-	-	-	-	-
St. Vincent	389	-	-	-	-	-	-	-	-	-	-
Surinam	163 820	163 750	99.9	-	-	49 035	29.9	114 715	70.1	-	-
Virgin Islands (U.K.)	174	-	-	-	-	-	-	-	-	-	-
Virgin Islands (U.S.)	344	344	100.0	344	100.0	-	-	-	-	-	-
Total	40 379 597	15 663 997	38.8	3 094 820	19.8	1 876 563	12.0	10 667 988	68.1	24 626	0.1

a) The decrease is due to a reappraisal of the extent of the malarious area.

Graph 2

DISTRIBUTION OF POPULATION IN THE ORIGINALLY MALARIOUS AREAS OF THE AMERICAS BY PHASE OF THE PROGRAM, 1969



During 1969 the areas in consolidation phase and in maintenance continued to make progress with only limited foci detected in the northeast which responded well to remedial measures. The population in the area in consolidation was increased by more than one million. In the area in attack phase, the number of malaria cases was reduced from 79,588 in 1968 to 55,503 in 1969.

For the first time, a primary division of the country as a whole entered the consolidation phase. This was the State of Rio de Janeiro in which a plan to integrate the Malaria Eradication Services and the General Health Services is now being implemented.

COLOMBIA

As the malaria eradication program progresses, the fertile low lands of the Andes valleys become inhabitable, resulting in an expansion of organized and/or unorganized colonization. There are six such areas of colonization which have been responsible for 80 per cent of all malaria cases detected in the country. The population in the six areas totals 700,000, of which 206,000 are living in the area where all the malaria eradication field activities had to be suspended in the last two years due to serious social unrest. Under the present situation, malaria transmission in the area of colonization can only be maintained at a low level of intensity to permit the agricultural and economic development of the country. The Government has been fully aware of the importance of malaria problems in relation to the economic development of the country and has given adequate priority to the program.

Malaria transmission in the rest of the attack area with 3 million inhabitants can be interrupted, but continuous application of attack measures will be necessary as long as the problems in the six areas of colonization continue. The consolidation area with 8.6 million inhabitants is subjected to constant importation of malaria cases, but reestablishement of endemicity is unlikely to occur.

COSTA RICA

Since the initiation of the 3-year plan in January 1968, the program has made remarkable progress. Malaria transmission has been practically interrupted except for two small areas, one being located on the frontier with Panama and the other in an area of new colonization. The continuation of the current efforts is expected to achieve complete interruption of malaria transmission in a short period of time. The local health services are relatively well organized, but its coverage in the rural area is insufficient to maintain a good malaria surveillance. A plan is being made to overcome this problem.

CUBA

All of the originally malarious area are presently in consolidation. The last autochthonous case of malaria was registered in June 1967 and an effective malaria surveillance program has been integrated into the general health activities.

DOMINICAN REPUBLIC

Malaria transmission has been interrupted except for one focus on the frontier. A surveillance system within the general framework of the health services is being developed in areas of consolidation and maintenance. However, it is considered indispensable to maintain insecticide protection in the localities bordering Haiti as long as malaria transmission exists in that country.

ECUADOR

The new-7-year plan of operations was initiated in the middle of 1968 but, due to a series of administrative and financial difficulties, no progress was observed in 1969; on the contrary, the number of malaria cases increased from 37,043 in 1968 to 50,957 in 1969. This increase is attributed to the interruption or reduction of attack measures in the 3 previous years. To date, there is no evidence of any serious technical problems. Future progress is, however, dependent upon resolving financial, administrative and operational problems.

EL SALVADOR, GUATEMALA, HONDURAS, AND NICARAGUA

The above four countries in Central America have followed a very similar trend of progress, and above all, have their major problems in common. Their 3-year plans, which were elaborated under the same administrative and ecological considerations, were initiated in January 1968. The principal attack measure has been DDT residual spraying. In those areas where the vector is resistant to DDT (at various degrees), mass drug administration has been added as a supplementary measure.

In Central America, except for British Honduras and Costa Rica, the problems of vector resistance to DDT and low acceptance of mass drug treatment on the part of the population continued to be the main obstacles for further progress. Although malaria incidence has been reduced or maintained at more or less the same level since the initiation of the 3-year plan (1968-1970), it is unlikely that malaria transmission would be interrupted in the four countries by the end of 1970 as originally expected.

Alternative attack measures were sought during the year. After a series of studies made by the Government and PAHO, it was concluded that the change of insecticides in the problem areas would be the most practical way to improve the current situation. Appropriate actions were taken to introduce such changes in 1970. Regarding the number of cases, the following differences were observed in 1969 in comparison with 1968.

	Malaria cases	
	1968	1969
El Salvador	35 831	25 299
Guatemala	10 407	10 494
Honduras	15 666	29 584
Nicaragua	8 250	16 043

GUYANA

Malaria transmission has been practically interrupted in the interior where medicated salt has been in use. However, in view of the experience of reinfection in 1965 after the suspension of medicated salt, it is considered necessary to continue the distribution of the salt for two more years. During 1969, a total of 25 cases of malaria was found in the country, of which only 3 cases were classified as autochthonous.

A continuing problem in Guyana is the need for development of health services in the interior to assume the responsibility of surveillance activities when the program enters consolidation phase. Establishment of some sanitarian posts, using the existing malaria personnel and voluntary collaborators, is being considered.

HAITI

In 1969, a total of 5,005 cases of malaria was identified as compared to 2,562 in 1968. Failure to interrupt transmission has been attributed to lack of consistency in application of attack measures together with operational difficulties. These factors were taken into consideration in development of the plan of work. In a concentrated foci where the vector is resistant to DDT, a drainage system is under construction and breeding areas are being larvicided. Since the program is primarily dependent upon assistance from national and international agencies, prospects of eradication are dependent upon their continuing support.

MEXICO

At the beginning of 1969, the Government approved a new plan of operations with the objective of achieving complete interruption of malaria transmission in six years. However, no additional funds were allocated to carry out the proposed plan of intensified field activities.

The program continued its "transitional period" activities as carried out in previous years in trying to prevent further deterioration. Despite the efforts, however, malaria incidence increased in 1969. It is hoped that adequate funds will be obtained in 1970 for the program to carry out its new plan of operations.

PANAMA

The 3-year plan similar to those of the Central American countries was initiated in April 1969, and the first spraying cycle under the new plan began in July 1969. The program has a good prospect of success if operational and administrative problems can be overcome. The vector, A. albimanus, is susceptible to DDT. The Government has given a high priority to the program and adequate financing has been assured through 1971.

PARAGUAY

Since its initiation of the new plan of operations in September 1968, the spraying coverage has been satisfactory and good results have been obtained. The Government has given a high priority to the program and assurances of sufficient financing until eradication is achieved. In 1969, 10,307 cases of malaria were identified as compared to 20,743 cases in 1968.

PERU

The malaria situation in the country has shown progress and, at present, 74 per cent of the population of the originally malarious areas are in consolidation and maintenance phases. Malaria transmission has been interrupted in the valleys of the coastal plains and in the valleys of the southern part of the Andes. It still continues at a low level, however, in the valleys of the northern part of the Andes and in the Amazon Region.

If the financial difficulties are solved, the prospects for eradication of malaria in Peru are good. In this respect, the Government has allocated the necessary funds for 1970 and has given assurances of continued support until 1974.

VENEZUELA

In Venezuela, 94.4 per cent of the population of the originally malarious area are presently in maintenance phase and the rest in attack phase. In the maintenance area 104 autochthonous cases were identified in 1969, but 89 of them were from Municipio Libertad in the southwestern part of the state of Zulia. The focus is located in an area adjacent to areas under attack. The situation in the rest of the area in maintenance, continue to be satisfactory.

In the area in attack, the number of malaria cases increased from 5,555 in 1968 to 7,933 in 1969. Taking into account only autochthonous and intruduced cases, 69.5 per cent were registered in the western part of the country and the remaining 30.5 per cent in the southern part. Efforts are being made to develop attack measures to solve the problem of persistent transmission in the areas where the current measures are only partially effective.

BRITISH HONDURAS

The program in British Honduras made considerable progress from 1957 to 1963 when the entire malarious area entered the consolidation phase. The subsequent importation of cases and lack of an efficient surveillance system resulted in the reestablishment of malaria transmission and 60 per cent of the malarious area of the country had to be returned to attack phase in 1967.

At present, malaria transmission has been practically interrupted. Although eradication of malaria from British Honduras is quite feasible, the maintenance of malaria-free status will require continuation of some attack measures as long as transmission exists in the neighbouring countries.

FRENCH GUIANA

At present, 92 per cent of the 43,000 inhabitants live in areas in consolidation. The populated coastal zone is practically free of malaria transmission though occasional foci occur due to the importation of cases from the interior. To solve this problem, spraying of houses with DDT was reinstituted in the coastal zone. In the interior, spraying operations were supplemented by distribution of amodiaquinized salt, covering a population of some 3,000 people.

The program has received adequate support from the Government and eradication of malaria from the country is feasible.

SURINAM

Of the total population in the originally malarious areas of the country, nearly 85 per cent live in the coastal zone and are in consolidation. The remaining population, however, is mainly constituted of groups whose cultural patterns have prevented the program from achieving adequate coverage with insecticides. As an alternative attack measure, amodiaquinized salt was used to protect this segment of the population. The slide positivity rate was reduced from 12 per cent in 1968 to 3 per cent in 1969. Though acceptance of medicated salt was low at the beggining of its use, it has increased in the last two years. Nevertheless, the privately owned stock of plain salt still continues to prevent the acceptance of amodiaquinized salt by some of the inhabitants.

It is believed that the current attack measures will eventually obtain the objectives of the program to which the Government is giving high priority and adequate financial support.

C. Field Operations

Residual spraying with insecticides was carried out as the principal attack measure in all malaria eradication projects except for those in the three Guianas where this measure was supplemented by the distribution of medicated salt. In the programs in Central America, Panama, and Haiti, mass drug administration was used as a complementary measure in the areas where the vector is partially resistant to DDT or malaria is persistent. In some areas in Guatemala, Honduras, El Salvador, and Nicaragua where the vector is highly resistant to DDT, residual house spraying with this insecticide was discontinued in July 1969. The results of spraying operations are summarized in the country tables by each spraying cycle.

During the year, a total of 14,264,304 residual spray applications of insecticides was made. As noted in Table 12, the percentage of houses sprayed in relation to those planned for spraying varied by program and by cycle.

Comparative figures for 1968 and 1969 of the overall personnel resources of malaria eradication programs are presented in Table 13 and more detailed figures, by program, in Tables 14 through 17. With respect to the number of spraymen, there was a considerable decrease in their number in 1969 in relation to 1968. This difference is due mainly to the reduction of spraying activities in Brazil in the second half of the year and differences in reporting of spraymen and evaluators by Mexico. In 1968, the number of spraymen reported by Mexico included evaluators, while in 1969, they were reported separately. The increase in the number of spraying personnel in Ecuador was the result of expanded operations which had not been possible in the previous years due to financial difficulties. The initiation of the 3-year plan in Panama is reflected by the increase of all field personnel, but primarily, in the categories of spraymen and evaluators.

Table 18 summarizes means of transport by country and type. Under each type of transport, the number of units is recorded in accordance to their field usage. During the year, UNICEF continued to provide spare parts for repairs and maintenance.

Table 12

SUMMARY OF HOUSES SPRAYED WITH RESIDUAL INSECTICIDES, BY COUNTRY AND BY CYCLE, 1969

Country or other political 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	64 705	46 404	71.7	45 571	38 355	84.2	-	-	-	-	-	-	84 759
Bolivia	23 881	14 715[a]	61.6	28 189	23 035[a]	81.7	-	-	-	-	-	-	37 750
Brazil, (Federal)	4 079 989	3 601 762	88.3	2 222 487	2 266 725	102.0	-	-	-	-	-	-	5 868 487
Brazil, (São Paulo)	22 522	20 628	91.6	22 246	18 628	83.7	-	-	-	-	-	-	39 256
Colombia (2 cycles)	463 187	397 427	85.8	464 692	451 315	97.1	-	-	-	-	-	-	848 742
(4 cycles)	18 691	18 164	97.2	19 343	18 958	98.0	23 785	22 259	93.6	23 609	22 996	97.4	82 377
Costa Rica	73 537	68 123	92.6	74 725	69 299	92.7	-	-	-	-	-	-	137 422
Dominican Republic	77 006	71 818	93.3	68 036	64 371	94.6	-	-	-	-	-	-	136 189
Ecuador	321 655	308 631	96.0	352 330	290 198	82.4	-	-	-	-	-	-	598 829
El Salvador	334 576	328 778	98.3	335 126	346 004	103.3	-	-	-	-	-	-	674 782
Guatemala	379 477[b]	350 848[b]	92.5	382 532[c]	307 125[c]	80.3	-	-	-	-	-	-	657 973
Guyana	6 542[d]	5 477[d]	83.7	-	-	-	-	-	-	-	-	-	5 477
Haiti	595 000[e]	549 869[e]	92.4	-	-	-	-	-	-	-	-	-	549 869
Honduras	191 937	195 462	101.8	171 288	164 954	96.3	-	-	-	-	-	-	360 416
Mexico	1 515 935	1 526 901[f]	100.7	407 363	609 871[f]	149.7	-	-	-	-	-	-	2 136 772
Nicaragua	183 385	165 772	90.4	165 444	154 829	93.6	-	-	-	-	-	-	320 601
Panama	208 154	183 546	88.2	215 369	196 003	91.0	-	-	-	-	-	-	379 549
Paraguay	314 102[b]	311 000[b]	99.0	317 805[c]	313 917[c]	98.8	-	-	-	-	-	-	624 917
Peru (2 cycles)	48 821	49 959	102.3	49 268	49 607	100.7	-	-	-	-	-	-	99 566
(3 cycles)	22 832	23 585	103.3	22 831	24 181	105.9	23 717	26 643	112.3	-	-	-	74 409
Venezuela (2 cycles)	68 262	63 325	92.8	59 771	43 287	72.4	-	-	-	-	-	-	106 612
(3 cycles)	37 833	35 494	93.8	38 250	36 783	96.2	38 473	36 384	94.6	-	-	-	108 661
(4 cycles)	77 474	73 873	95.4	78 153	66 481	85.1	78 874	71 595	90.8	79 460	65 254	82.1	277 203
British Honduras	10 127	9 060	89.5	11 127	10 533	94.7	-	-	-	-	-	-	19 593
French Guiana	28 105[c]	26 861[c]	95.6	-	-	-	-	-	-	-	-	-	26 861
Surinam	14 550	3 935	27.0	14 550	3 297	22.7	-	-	-	-	-	-	7 232
Total	9 182 285	8 451 417	92.0	5 566 496	5 567 756	100.0	164 849	156 881	95.1	103 069	88 250	85.6	14 264 304

a) Includes 5 937 houses sprayed in focal attack. b) First complete cycle of 1969, from April to September. c) Second cycle started in October and ended in March 1970. d) Figures for entire year, not separated by cycle. e) Only one spraying cycle during the year. f) Includes houses sprayed once a year, and focal sprayings in Consolidation phase.

Table 13

PERSONNEL EMPLOYED IN MALARIA ERADICATION PROGRAMS IN THE AMERICAS
31 DECEMBER 1968 AND 1969, BY CATEGORY

(Part-time personnel in parentheses)

	Title	1968	1969
SPRAYING OPERATIONS	Engineers	96 (1)	93
	Spraying Chiefs	350 (2)	305
	Sector Chiefs	611	1 298
	Squad Chiefs	1 923	2 393
	Spraymen	13 048 (80)	10 554 (85)
	Draftsmen	214	214 (1)
	SUB-TOTAL	16 242 (83)	14 857 (86)
EPIDEMIOLOGICAL OPERATIONS	Physicians	256 (7)	207 (4)
	Entomologists	38 (16)	80
	Entomologist Assistants	212 (3)	244
	Statisticians and Statisticians' Assistants	249	260
	Evaluation Inspectors	943 (1)[a]	912 (1)[a]
	Evaluators	6 843[a]	7 739[a]
	Microscopists	1 064 (88)	1 064 (6)
	SUB-TOTAL	9 605 (115)	10 506 (11)
ADMINISTRATION AND OTHERS	Administrators	222	156 (1)
	Administrative Assistants	1 250	1 697
	Accountants	76	43
	Disbursing Officers	100	58
	Storekeepers	114	75
	Storekeepers's Assistants	391	82
	Secretaries	379 (2)	374
	Others	1 684 (1)	1 373 (63)
	SUB-TOTAL	4 216 (3)	3 858 (64)
TRANSPORT	Transport Chiefs, Mechanics and Assistant Mechanics	709	828
	Drivers	1 838 (2)	1 538
	Motorboat Operators	485 (2)	436
	Boatment	318	322
	SUB-TOTAL	3 350 (4)	3 124
	GRAND TOTAL	33 413 (205)	32 345 (161)

a) Includes personnel with same category from the mass drug treatment program.

Table 14

PERSONNEL EMPLOYED IN SPRAYING OPERATIONS IN MALARIA ERADICATION PROGRAMS IN THE AMERICAS - 31 DECEMBER 1969

(Part-time personnel in parentheses)

Country or other political unit	Total	Engineers	Sanitarians or Spraying Chiefs	Sector Chiefs	Squad Chiefs	Spraymen	Draftsmen
Argentina	96	2	1	5	16	59	13
Bolivia	48 (81)	-	9	24	-	15 (81)	-
Brazil	7 881	32	80	661[a]	1 107	5 935	66
Colombia	1 180	8	25	84	290	758	15
Costa Rica	150	-	2	27	30	88	3
Dominican Republic	70	1	2	-	10	57	-
Ecuador	603	2	-	50	99	450	2
El Salvador	488	1	6	21	86	372[b]	2
Guatemala	514	1	11[c]	33[a]	79	386[b]	4
Guyana	12	-	1	-	4	7	-
Haiti	45	1	4	22	3	15	-
Honduras	237	-	8	8	35	185	1
Mexico	1 427	35	119	194	329	724	26
Nicaragua	353	1	7	23	55	264[b]	3
Panama	327	1	8	31	49	228	10
Paraguay	472	2	8	42	89	325	6
Peru	230	4	-	32	38	150	6
Trinidad and Tobago	92	-	1	1	2	88[b]	-
Venezuela	521	2	-	32	58	374	55
British Honduras	19 (5)	-	1	-	3 (1)	15 (4)	-
French Guiana	77	-	11	3	8	55	-
Surinam	15	-	1	5	3	4	2
Total	14 857 (86)	93	305	1 298	2 393 (1)	10 554 (85)	214

a) Performing activities as evaluation inspectors.
b) Includes personnel from the larviciding program.
c) Includes 8 Chiefs of zone with functions as spraying supervisors and drug distributors.

Table 15

PERSONNEL EMPLOYED IN EPIDEMIOLOGICAL EVALUATION OPERATIONS IN MALARIA ERADICATION PROGRAMS IN THE AMERICAS - 31 DECEMBER 1969

(Part-time personnel in parentheses)

Country or other political unit	Total	Physicians	Entomologists	Assistant Entomologists	Statisticians and Statisticians' Assistants	Evaluation Inspectors	Evaluators	Microscopists and laboratory personnel
Argentina	194	2	1	3	2	30	134[a]	22
Bolivia	111	8	-	2	6	3	79[a]	13
Brazil	2467	51	48[b]	48	103	(c)	1926	291
Colombia	1022	13	3	1	3	123[a]	824[a]	55
Costa Rica	170	2	-	3	2	9[a]	134[a]	20
Cuba	261	-	-	-	-	-	200	61
Dominican Republic	214	2	1	3	4	26	142	36
Ecuador	195	9	2	6	4	-	141	33
El Salvador	744	6	1	10	12	113[a]	541	61
Guatemala	513 (3)	4	1	11	6	23[a]	437[a]	31 (3)
Guyana	34 (1)	(1)	-	-	3	-	25	6
Haiti	354	10	1	10	11	217[a]	59[a]	46
Honduras	505	3	-	7	17	61[a]	353[a]	64
Jamaica	66	3[d]	1	35	1	14	-	12
Mexico	1708	54	9	8	14	89	1408	126
Nicaragua	692	3	1	29	15	78[a]	516[a]	50
Panama	183	1	1	5	7	14	135	20
Paraguay	86	5	2	5	12	-	45	17
Peru	295	5	4	1	25	15	222[a]	23
Trinidad and Tobago	121	2	1	39	1	1	70	7
Venezuela	489	21	2	16	9	85	298	58
British Honduras	11 (1)	(1)	-	-	-	1	9	1
Dominica	9 (1)	(1)	-	-	-	4	4	1
French Guiana	7	1	1	2	-	1	-	2
Guadeloupe	7 (4)	1 (1)	-	-	-	-	6	(3)
St. Lucia	3 (1)	-	-	-	-	1 (1)	1	1
Surinam	45	1	-	-	3	4	30	7
Total	10506 (11)	207 (4)	80	244	260	912 (1)	7739	1064 (6)

a) Includes personnel with same category from mass drug distribution activities.
b) Including 38 malariologists.
c) Performing activities as Sector Chiefs also.
d) 2 Scientific Officers.

Table 16

PERSONNEL EMPLOYED IN ADMINISTRATIVE AND OTHER SERVICES IN MALARIA ERADICATION PROGRAMS IN THE AMERICAS - 31 DECEMBER 1969

(Part-time personnel in parentheses)

Country or other political unit	Total	Administrators	Administrative Assistants	Accountants	Disbursing Officers	Storekeepers	Storekeepers' Assistants	Secretaries	Other
Argentina	111	5	70	-	5	3	6	1	21
Bolivia	57	7	3	1	1	1	2	7	35
Brazil	1 904	76	1 231	1	1	-	-	45	550
Colombia	303	19	20	6	15	20	7	81	135
Costa Rica	43	2	3	1	5	2	3	4	23
Dominican Republic	44	1	4	1	-	2	2	2	32
Ecuador	105	5	1	5	7	3	4	20	60
El Salvador	78	1	15	-	1	2	4	8	47
Guatemala	107	1	3	5	3	1	4	21	69
Guyana	23	-	-	-	-	1	-	1	21
Haiti	121	7	4	3	4	5	5	9	84
Honduras	71	2	22	1	-	1	2	7	36
Jamaica	23	1	2	-	-	1	1	3	15
Mexico	511	12	259	3	12	13	20	122	70
Nicaragua	78	7	11	6	-	7	8	13	26
Panama	77	2	17	3	-	1	2	8	44
Paraguay	48	1	6	1	3	1	3	3	30
Peru	79	4	23	5	-	7	5	14	21
Trinidad and Tobago	50	1	1	1	-	2	2	1	42
Venezuela	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)
British Honduras	4	1	-	-	-	-	-	2	1
Canal Zone	(36)	-	-	-	-	-	-	-	(36)[b]
Dominica	(1)	(1)	-	-	-	-	-	-	-
French Guiana	3	-	-	-	-	-	-	2	1
Puerto Rico	(27)	-	-	-	-	-	-	-	(27)[b]
Surinam	18	1	2	-	1	2	2	-	10
Total	3 858 (64)	156 (1)	1 697	43	58	75	82	374	1 373 (63)

a) Services performed by personnel of the "Dirección de Malariología y Saneamiento Ambiental", in charge of different programs of environmental sanitation.
b) Performing different activities of malaria control.

Table 17

PERSONNEL EMPLOYED IN TRANSPORT SERVICES IN MALARIA ERADICATION PROGRAMS IN THE AMERICAS - 31 DECEMBER 1969

(Part-time personnel in parentheses)

Country or other political unit	Total	Transport Chiefs, mechanics and assistant mechanics	Drivers	Motorboat operators	Boatmen
Argentina	83	30	46	-	7
Bolivia	21	-	9	7	5
Brazil	1458	365	794	119	180
Colombia	445	98	98	195	54
Costa Rica	25	11	14	-	-
Dominican Republic	40	18	22	-	-
Ecuador	81	10	48	-	23
El Salvador	158	41	117	-	-
Guatemala	71	19	52	-	-
Guyana	19	1	5	7	6
Haiti	43	23	12	2	6
Honduras	81	17	63	1	-
Jamaica	37	4	33	-	-
Mexico	151	120	18	13	-
Nicaragua	113	20	74	18	1
Panama	16	10	5	1	-
Paraguay	92	13	74	5	-
Peru	86	22	25	38	1
Trinidad and Tobago	10	-	10	-	-
Venezuela	(a)	(a)	(a)	(a)	(a)
British Honduras	2	2	-	-	-
French Guiana	19	1	7	1	10
St. Lucia	1	-	1	-	-
Surinam	72	3	11	29	29[b]
Total	3124	828	1538	436	322

a) Services performed by personnel of the "Dirección de Malariología y Saneamiento Ambiental" in charge of different programs of environmental sanitation. b) Also function as spraymen and medicated salt distributors.

Table 18

MEANS OF TRANSPORT IN MALARIA ERADICATION PROGRAMS IN THE AMERICAS, 1969

Country or other political unit	Trucks (3 tons or more)		Trucks and "Pick-up" (less than 3 tons)		Jeeps		Automobiles and station wagons		Motorcycles		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	2	3	59	50	30	11	7	3	-	-	46	14	5	-	-	-	-	-	-
Bolivia	-	-	3	4	34	8	1	1	-	30	25	23	23	10	-	-	95	61 c)	11
Brazil	66	12	329	74	706	162	48	-	-	-	710	100	339	-	137	-	3 000	5 d)	-
Colombia	10	3	132	8	157	12	19	2	2	1	143	-	175	38	124	11	1 503	95 d)	8 d)
Costa Rica	1	-	18	1	15	-	4	-	19	14	107	42	19	14	16	-	44	2	-
Cuba	-	-	9	10	50	17	-	-	-	-	-	-	-	-	-	-	-	-	-
Dominican Republic	1	-	72	-	2	-	6	-	129	-	-	62	-	-	-	-	71	-	-
Ecuador	2	-	31	14	40	15	6	2	40	-	-	37	30 d)	-	21	-	300	50 e)	20 e)
El Salvador	1	-	52	6	31	8	7	-	119	10	7	1	-	-	6	-	-	-	-
Guatemala	2	-	41	-	37	-	5	-	100	-	200	-	10	-	1	-	-	-	-
Guyana	1	-	1	-	6	2	-	-	6	2	10	-	11	-	3	-	-	-	-
Haiti	-	-	-	54	-	60	-	12	-	-	-	-	-	2	-	-	-	-	-
Honduras	3	1	33	18	35	14	8	2	51	18	10	35	3	1	-	-	209	-	-
Jamaica	-	2	-	-	-	34	-	2	-	-	-	-	-	-	-	2	-	-	-
Mexico	4	15	243	214	246	151	14	9	-	-	-	-	21	-	-	-	2 202	-	-
Nicaragua	2	-	29	6	30	8	11	1	40	12	5	-	-	-	47	-	-	30 e)	13 e)
Panama	2	-	30	25	23	10	10	1	56	-	-	-	29	16	-	-	-	-	-
Paraguay	2	-	77	11	3	12	18	2	21	3	3	-	13	-	8	-	-	-	-
Peru	2	-	48	-	18	-	66	-	-	-	-	-	118	-	12	-	-	-	-
Trinidad and Tobago	-	2	-	-	5	3	-	-	-	-	-	-	-	-	-	-	-	-	-
Venezuela	6	-	137	-	93	-	35	-	18	-	333	-	124	-	-	-	635	36 f)	-
British Honduras	1	4	1	7	-	-	1	-	-	-	2	-	7	2	-	-	-	-	-
Canal Zone	-	-	2 g)	-	-	-	-	-	-	-	-	-	2 g)	-	2 g)	-	-	-	-
Dominica	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-
French Guiana	1	-	1	-	8	-	-	-	-	-	-	-	3	-	-	-	-	6 e)	-
Guadeloupe	-	-	-	-	-	-	2	1 g)	-	-	-	-	-	-	-	-	-	-	-
St. Lucia	-	-	-	-	1	-	-	-	-	1	-	-	-	-	-	-	-	-	-
Surinam	1	-	1	2	1	-	6	2	15	-	5	-	12	12	-	-	-	-	-
Total	110	42	1 349	504	1 571	528	274	40	616	91	1 606	314	944	95	377	13	8 059	285	52

a) In good condition. b) In bad condition. c) Airplanes. d) Canoes. e) Out-board motors. f) Fogging machines. g) Part-time.

In Table 19 is shown the distribution of the blood smears collected from active case detection activities and from the passive network. The vast bulk of the smears produced by the passive network continues to come from voluntary collaborators, and a small percentage from the general health services and medical profession. As can be seen, the passive network produced 34.3 per cent of the total blood smears examined in the year, and 63.3 per cent of the total malaria cases in the Region.

D. Coordination of activities between general health services and malaria eradication programs

The countries with malaria eradication programs in advanced stages have given their special attention to promote the participation of the general health services in malaria vigilance activities and to orientate malaria personnel in other health programs with the purpose of eventual integration of all health activities.

In Brazil, the State of Rio de Janeiro paved the way for the integration of the malaria services into general health frameworks with initiation of a plan in June 1969. The two services were completely integrated under the command of the health officers of the State, and are carrying out activities related to vaccination, sanitation, vital statistics, etc., in addition to malaria vigilance.

In Cuba, the responsibility of malaria vigilance is completely in the hands of the general health services, which have maintained the malaria-free status effectively.

In Peru, the general services have assumed the responsibility of malaria vigilance in the coastal area where malaria eradication had been achieved. The malaria personnel were transferred to health services and given orientation in other health activities. During 1969, preparatory arrangements were made to expand the integrated activities in the Departments of Cuzco, Madre de Dios, Apurimae and Puno where malaria transmission had been interrupted. Their integration of work will be implemented in 1970.

During the year, similar activities were being undertaken in Argentina, Bolivia, Colombia, Costa Rica and Ecuador. Even in those countries with programs in attack phases, efforts were made to promote the participation of the health services in the case detection activities.

To coordinate the above mentioned activities, PAHO has had an intercountry project since 1966 which provides advisory services to interested countries.

E. Budget

The expenditures of the Government for malaria eradication in 1969 and their budgets for 1970 are presented program-by-program in Table 20. There were 10 programs which received AID assitance to supplement local costs. This assistance was provided through loans to nine countries and in the form of a grant to one (Haiti). The same ten programs are expected to receive assistance in 1970.

The global national expenditures of 1969 totaled $46,166,000, while the budgets approved at the beginning of the year amounted to $51,492,000. The difference is reflected mainly by budget reductions in Brazil, Ecuador and Nicaragua during the course of the year. For 1970, a total of $49,360,000 was tentatively approved for local costs.

The contributions of the Governments and of the assisting agencies to the malaria eradication programs in the Americas is shown in Graph 3. As can be seen, total expenditures for malaria declined in 1969 following a steady increase since 1961. The decrease in expenditures is due to budget reductions in those countries as noted above. It can also be noted (Graph 3) that beginning in 1966, AID has gradually increased its assistance in the form of loans to supplement governmental funds.

Table 21 summarizes the estimated budgetary and personnel requirements of PAHO/WHO for support of malaria eradication programs through 1972.

(Text continues on page 120)

Table 19

COMPARATIVE RESULTS OF ACTIVE AND PASSIVE CASE DETECTION IN MALARIA ERADICATION PROGRAMS IN THE AMERICAS, 1969

Country or other political unit	Active case detection					Passive case detection						Total	
		Bloods slides						Blood slides				Blood slides	
	Average number of evaluators	Examined	Positive	Per cent	Average production per evaluator per month	Average number of notification posts	Average of notification post producing slides per month	Examined	Positive	Per cent	Average of slides per month per productive notification post	Examined	Positive
Argentina	130	74 174	168	0.2	47.5	1 020	209	85 004	79	0.09	33.9	159 178	247
Bolivia[a]	82	135 723	2 371	1.7	150.5	2 610	419	31 564	1 586	5.0	6.3	167 287	3 957
Brazil	1 749	1 599 274	18 780	1.2	76.2	21 755	8 395	540 611	38 171	7.1	5.4	2 139 885	56 951
Colombia	743	481 438	18 762	3.9	54.0	9 967	5 262	286 428	20 673	7.2	4.5	767 866	39 435
Costa Rica	127	188 062	337	0.2	123.4	1 197	255	14 300	351	2.5	4.7	202 362	688
Cuba	213	171 665	0	0	67.2	2 053	469	575 162	3	0.0	102.2	746 827	3
Dominican Republic	141	410 243	81	0.02	242.5	4 814	2 373	219 452	43	0.01	7.7	629 695	124
Ecuador	113	88 145	1 721	2.0	65.0	5 737	3 763	333 505	49 236	14.8	7.4	421 650	50 957
El Salvador	104	539 767	5 391	1.0	432.5	2 588	2 141	319 149	19 908	6.2	12.4	858 916	25 299
Guatemala	88	305 268	5 709	1.9	289.1	3 808	2 173	216 068	4 785	2.2	8.3	521 336	10 494
Guyana	19	47 113	13	0.03	206.6	175	26	23 008	12	0.05	73.7	70 121	25
Haiti	96	513 911	3 463	0.7	446.1	6 556	2 620	172 256	1 542	0.9	5.5	686 167	5 005
Honduras	141	337 338	13 140	3.9	199.4	2 822	1 909	254 206	16 444	6.5	11.1	591 544	29 584
Jamaica	...	44 389	0	0	-	...	...	9 838	0	0	-	54 227	0
Mexico	1 886	2 170 042	29 520	1.4	95.9	43 542	5 758	354 018	22 606	6.4	5.1	2 524 060	52 126
Nicaragua	162	316 692	7 837	2.5	162.9	3 279	1 652	181 427	8 206	4.5	9.2	498 119	16 043
Panama	42	66 962	3 457	5.2	132.9	1 913	230	27 634	2 481	9.0	10.0	94 596	5 938
Paraguay	37	18 452	605	3.3	41.6	2 186	1 118	111 057	9 702	8.7	8.3	129 509	10 307
Peru	160	159 643	1 666	1.0	83.1	5 341	1 427	103 701	1 502	1.4	6.1	263 344	3 168
United States of America	-	-	-	-	-	...	...	1 572[b]	3 315	-	...	1 572	3 315
Trinidad and Tobago	70	15 997	0	0	19.0	...	...	26 275	5	0.02	-	42 272	5
Venezuela	307	236 057	5 465	2.3	64.1	2 284	696	232 101	3 195	1.4	27.8	468 158	8 660
British Honduras	10	8 007	7	0.09	66.7	129	43	4 187	21	0.5	8.1	12 194	28
Canal Zone	...	1 654	2	0.1	...	...	...	30 222	156	0.5	-	31 876	158
Dominica	2	2 222	0	0	92.6	26	3	557	0	0	15.5	2 779	0
French Guiana	-	-	-	-	-	10	...	7 000	52	0.7	...	7 000	52
Grenada[c]	-	-	-	-	-	...	...	980	0	0	-	980	0
Guadeloupe	...	17 320	0	0	...	...	...	92	0	0	-	17 412	0
Puerto Rico	-	-	-	-	-	...	...	4	4	100.0	-	4	4
St. Lucia	2	12 048	0	0	502.0	-	-	-	-	-	-	12 048	0
Surinam	32	28 400	293	1.0	74.0	77	10	9 794	448	4.6	81.6	38 194	741
Total	6 456	7 990 006	118 788	1.5	103.1	123 889	40 951	4 171 172	204 526	5.0	8.5	12 161 178	323 314

... No information.

a) November. b) Includes only those slides examined at NCDC. c) June.

Table 20

NATIONAL EXPENDITURES 1968-1969 AND BUDGET 1970
FOR MALARIA ERADICATION IN THE AMERICAS

(In thousands of U. S. dollars)

Country	National expenditures 1968	National Expenditures 1969			National Budget, 1970		
		Internal financing	Loans AID	Total	Internal financing	Loans AID	Total
Argentina	1 003	879	-	879	296[a]	-	296[a]
Bolivia	316	296	-	296	362	-	362
Brazil	14 435[b]	13 374	1 901	15 275	14 762	1 850	16 612
Colombia	2 968	3 531	-	3 531	3 446	-	3 446
Costa Rica	736[c]	534	299	833	491	274	765
Cuba	1 213	1 000	-	1 000	1 000	-	1 000
Dominican Republic	782	782	-	782	782	-	782
Ecuador	1 126[d]	852	550	1 402	853	550	1 403
El Salvador	1 403[e]	868	697	1 565	868	780	1 648
Guatemala	1 657[f]	982	577	1 559	978	485	1 463
Guyana	75	102	-	102	95	-	95
Haiti	1 622[g]	35	1 100[h]	1 135	35	1 400[h]	1 435
Honduras	1 228[i]	833	443	1 276	775	502	1 277
Jamaica	297[j]	297[j]	-	297[j]	297[j]	-	297[j]
Mexico	6 042	6 628	-	6 628	6 869	-	6 869
Nicaragua	1 845[k]	641	1 270	1 911	1 344[l]	1 003[m]	2 347
Panama	647	662	171	833	771	726	1 497
Paraguay	492[n]	384	521	905	574	440	1 014
Peru	902	733	-	733	1 145	-	1 145
Trinidad and Tobago	415	450	-	450	559	-	559
Venezuela	5 245	5 068	-	5 068	5 604	-	5 604
British Honduras	98	120	-	120	125	-	125
French Guiana	205	292	-	292	270	-	270
Surinam	275	294	-	294	319	-	319
Total	45 027	39 637	7 529	47 166	42 620	8 010	50 630

a) Does not include personnel salaries. b) Includes $194 484 from AID loan. c) Includes $255 101 from AID loan. d) Includes $515 515 from AID loan. e) Includes $803 160 from AID loan. f) Includes $509 440 from AID loan. g) Includes $1 587 000 from AID grant. h) AID grant. i) Includes $875 926 from AID loan. j) Includes general mosquito control program. k) Includes $1 200 215 from AID loan. l) Includes $580 457 not yet approved. m) $573 695 from AID loan and $429 289 in negotiation. n) Includes $70 431 from AID loan.

Graph 3

MALARIA ERADICATION IN THE AMERICAS
EXPENDITURES, 1957–1969

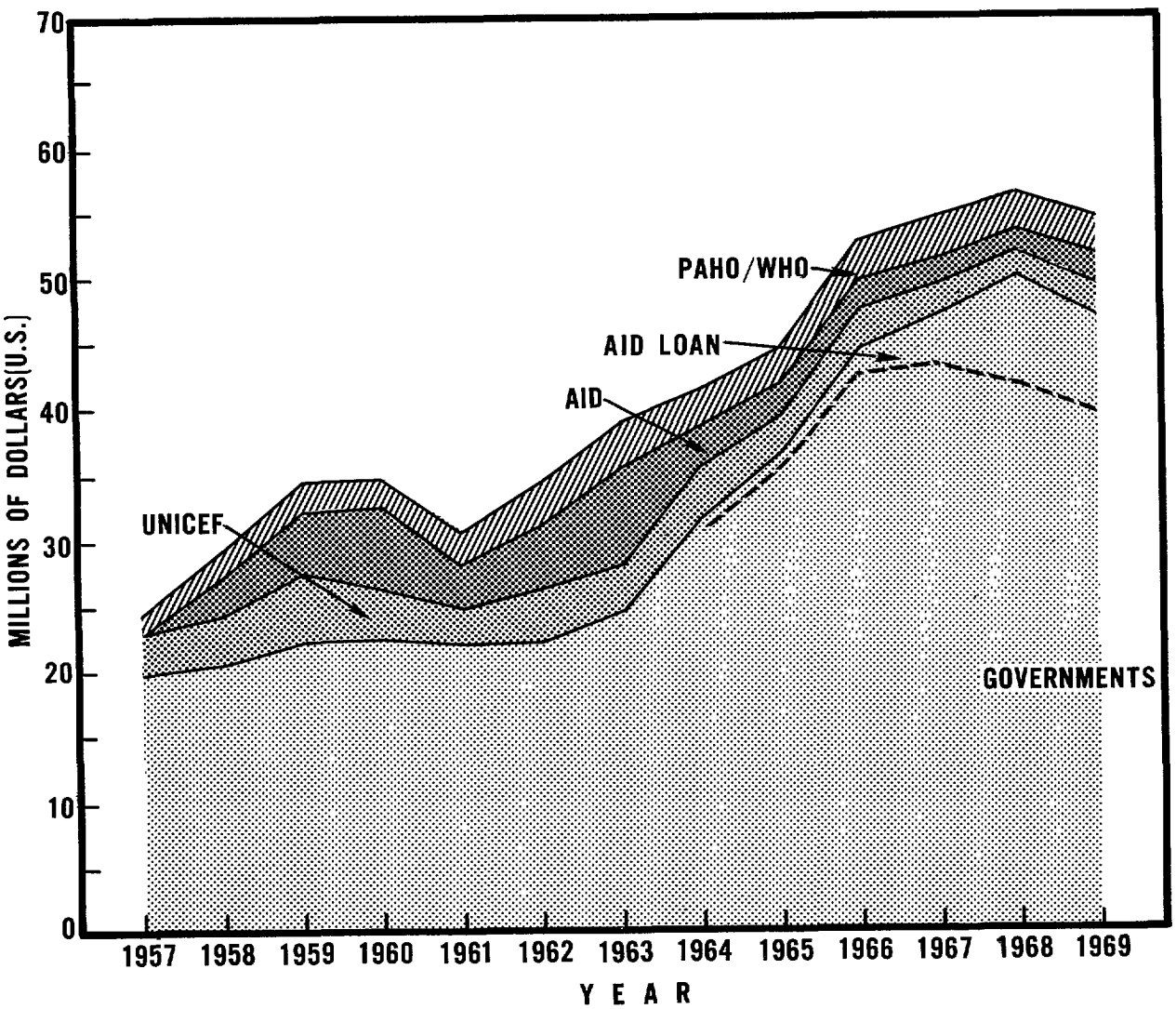


Table 21

ESTIMATED REQUIREMENTS FOR MALARIA ERADICATION PROGRAMS IN THE AMERICAS[a]

	1969[b]	1970[c]	1971[c]	1972[c]
TOTAL COST	43 957 778	50 972 252	50 672 898	52 493 993
GOV. AND OTHER SOURCES	41 351 000	48 395 500	48 188 770	50 068 570
PAHO/WHO PORTION:				
Personnel costs and travel	2 169 094	1 976 177	1 954 762	1 854 595
Supplies and equipment	396 991	475 800	427 586	473 670
Fellowships.....	16 531	26 400	23 800	21 000
Grants and others	24 162	98 375	77 980	76 158
SUB-TOTAL PAHO/WHO	2 606 778	2 576 752	2 484 128	2 425 423

SOURCES OF PAHO/WHO FUNDINGS

SOURCE	1969[b]	1970[c]	1971[c]	1972[c]
PAHO-Reg.	641 246	876 458	1 036 458	1 233 432
PAHO-SMF	1 142 862	1 111 991	873 410	664 070
WHO-Reg.	793 377	492 303	478 260	479 921
WHO-TA	29 293	96 000	96 000	48 000
TOTAL	2 606 778	2 576 752	2 484 128	2 425 423

PAHO/WHO PERSONNEL

CATEGORY	1969	1970	1971	1972
Medical Officer	38	34	33	34
Sanitary Engineer	12	10	9	9
Entomologist	8	6	6	5
Parasitologist	2	2	2	2
Epidemiologist	1	1	1	1
Economist	1	1	1	1
Statistician	-	1	1	1
Programmer Analyst	1	-	1	1
Adm. Methods Officer	4	4	3	2
Assistant Engineer.....	1	1	1	-
Laboratory Adviser	1	1	1	1
Sanitary Inspector	42	28	23	12
Other	17	16	15	16
TOTAL	128	105	97	85

a) Figures shown include all malaria eradication country projects, AMRO projects, supporting personnel in Zone offices and Malaria Eradication Department. They do not include activities in countries or territories entirely in maintenance phase, nor those of Venezuela.
b) Expenditures.
c) Estimated requirements.

ARGENTINA

STATUS OF MALARIA PROGRAM AT DECEMBER 1969

	Population (thousands)	Area km^2
TOTAL COUNTRY	23 440	4 024 458
Non malarious areas	20 453	3 675 407
Originally malarious areas		
Maintenance phase	1 648	111 661
Consolidation phase	432	79 624
Attack phase	907	157 766
Preparatory phase	-	-
Total originally malarious areas	2 987	349 051

PERSONNEL

Activity	Professional	Non professional	Total
Spraying operations	2	94	96
Evaluation operations	2	192	194
Administrative and other	-	111	111
Transport	-	83	83
Total	4	480	484

TRANSPORT FACILITIES

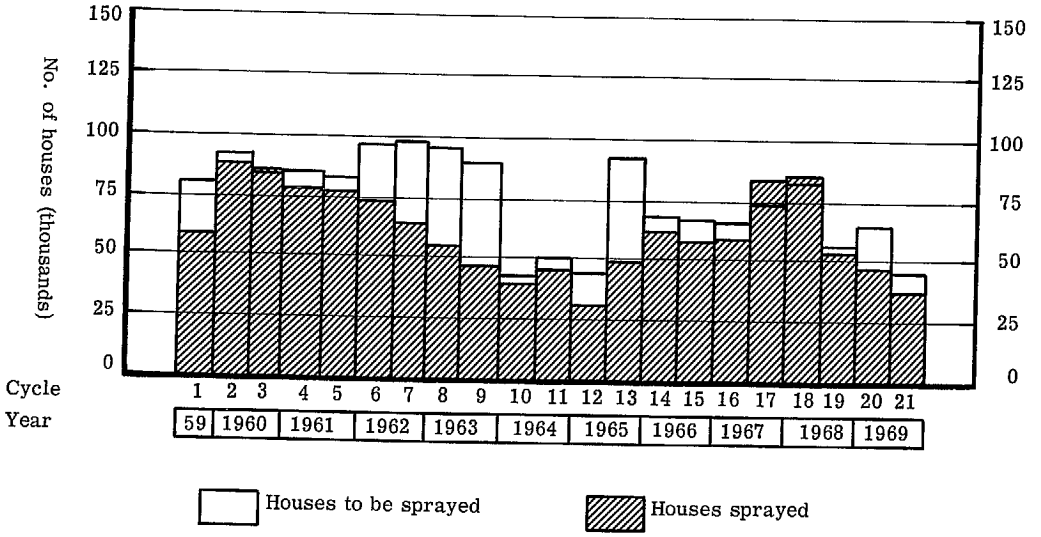
Type	Spraying Operations	Evaluation Operations	Mixed or other operations	Total
Four-wheel vehicles	37	64	64	165
Two-wheel vehicles	-	58	2	60
Boats	-	-	5	5
Animals	-	-	-	-
Other	-	-	-	-
Total	37	122	71	230

ARGENTINA (Cont.)

SPRAYING OPERATIONS

Year of total coverage	Date	Cycle DDT	Houses sprayed		Inhabitants directly protected		Insecticide used per house (g. technical) DDT	Average houses sprayed per spray-man/day
			Planned	Sprayed	Planned	Protected		
1st	Aug. 59-Jun. 60	1st	81 619	57 995[a]	288 768	205 189	263	...
		2nd	92 438	88 079[a]	347 012	330 733	255	
2nd	Jul. 60-Jul. 61	3rd	84 011	84 929[a]	323 610	327 209	305	...
		4th	84 077	76 991[a]	308 142	282 178	334	
3rd	Aug. 61-Jun. 62	5th	81 906	75 734[a]	303 290	280 425	383	...
		6th	96 249	73 027	341 780	259 379	349	
4th	Jul. 62-Jun. 63	7th	97 908	63 967	351 098	229 432	353	...
		8th	95 552	54 742[a]	318 288	182 273	329	
5th	Jul. 63-Jun. 64	9th	90 333	46 627	317 972	164 420	320	...
		10th	43 572	39 430	135 574	122 685	324	
6th	Jul. 64-Jun. 65	11th	50 322	44 972	172 313	153 995	302	...
		12th	43 927	30 236	138 809	95 417	302	15.7
7th	Jul. 65-Jun. 66	13th	90 224	48 428	327 495	175 788	416	21.1
		14th	66 853	60 220	217 492	195 913	366	19.2
8th	Jul. 66-Jun. 67	15th	65 304	57 484	227 149	199 949	403	12.0
		16th	65 340	58 707	228 690	205 885	462	20.8
9th	Jul. 67-Jun. 68	17th	72 836	83 306	...	292 874	473	21.5
		18th	82 490	83 866	412 000	290 444	481	23.0
10th	Jul. 68-Jun. 69	19th	55 730	54 382	278 000	194 479	454	23.3
		20th	64 705	46 404	207 060	160 922	468	...
11th	Jul. 69-Dec. 69	21st	45 571	38 355	157 190	137 817	479	...

a) Some houses were sprayed once a year.



EPIDEMIOLOGICAL EVALUATION OPERATIONS, ATTACK PHASE AREAS

Year	Slides examined			Species found		
	Total No.	Positive		P. falciparum	P. vivax	P. malariae
		Number	Percentage			
1959[a]	12 377	1 043	8.4	-	1 043	-
1960	82 191	2 013	2.4	7	2 006	-
1961	93 464	4 524	4.8	4	4 520	-
1962	112 477	4 685	4.2	-	4 685	-
1963	96 668	834	0.9	-	834	-
1964	102 683	543	0.5	-	543	-
1965	57 872	213	0.4	-	211	2
1966	89 065	300	0.3	-	300	-
1967	111 917	1 512	1.4	-	1 511	1
1968	61 601	418	0.7	-	418	-
1969	40 027	69	0.2	-	69	-

CONSOLIDATION PHASE AREAS

Year	Estimated population in the area (thousands)	No. of slides examined	% of population sampled (annual rate)	Total No. of positive cases	Origin of infections							Species of parasite		
					Autochthonous	Relapsing	Imported		Induced	Introduced	Not investigated and unclassified	P. falciparum	P. vivax	P. malariae
							from abroad	from areas within country						
1959[a]	911	9 491	2.5	51	-	-	-	32	-	19	-	-	51	-
1960[b]	929	14 438	1.5	26	-	-	-	14	-	12	-	-	26	-
1961[b]	1 278	44 395	3.5	17	-	2	-	5	-	10	-	-	17	-
1962[b]	1 542	39 675	2.6	23	-	10	-	5	1	7	-	-	20	3
1963[b]	1 584	60 742	3.8	11	2	-	-	6	2	-	1	-	9	2
1964[c]	1 648	41 926	5.1	10	1	-	-	7	-	2	-	-	10	-
	627	24 415	7.8	1	1	-	-	-	-	-	-	-	1	-
1965	449	92 658	20.6	41	20	-	1	8	3	7	2	-	38	3
1966	454	71 346	15.7	56	27	1	1	26	1	-	-	-	56	-
1967	387	82 208	21.2	53	41	1	5	1	-	-	5[d]	1	52	-
1968	423	75 300	17.8	126	101	-	8	6	-	-	11	-	126	-
1969	432	41 693	9.7	165	136	16	5	-	-	2	6	-	165	-

a) August-December. b) Including maintenance phase area. c) First semester includes maintenance phase. d) Includes one cryptic case.

ARGENTINA (Cont.)

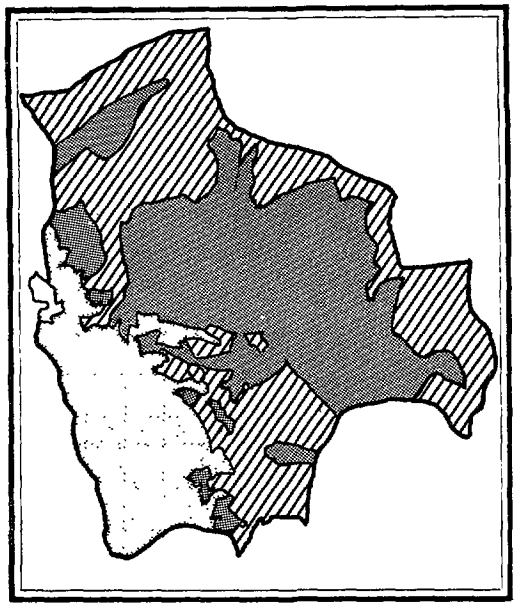
MAINTENANCE PHASE AREAS

Year	Estimated population in the area (thousands)	No. of slides examined	% of population sampled (annual rate)	Total No. of positive cases	Origin of infections							Species of parasite		
					Autochthonous	Relapsing	Imported		Induced	Introduced	Not investigated and unclassified	P. falciparum	P. vivax	P. malariae
							from abroad	from areas within country						
1964[a]	1 021	12 698	2.5	-	-	-	-	-	-	-	-	-	-	-
1965	1 356	32 351	2.4	-	-	-	-	-	-	-	-	-	-	-
1966	1 381	50 870	3.7	55	40	4	1	7	2	1	-	-	53	2
1967	1 477	65 210	4.4	55	49	1	1	1	2	-	1[b]	-	54	1
1968	1 631	103 958	6.4	35	27	-	-	7	-	-	1	-	35	-
1969	1 648	77 458	4.7	13	1	-	1	3	-	7	1	-	13	-

a) July-December. b) Cryptic case.

STATUS OF MALARIA PROGRAM AT DECEMBER 1969

BOLIVIA



	Population (thousands)	Area km^2
TOTAL COUNTRY	4 822	1 098 581
Non malarious areas	3 293	277 235
Originally malarious areas		
Maintenance phase	-	-
Consolidation phase	1 174	424 364
Attack phase	355	396 982
Preparatory phase	-	-
Total originally malarious areas	1 529	821 346

PERSONNEL

Activity	Professional	Non professional	Total
Spraying operations	-	48 (81)	48 (81)
Evaluation operations	9	102	111
Administrative and other	-	57	57
Transport	-	21	21
Total	9	228 (81)	237 (81)

TRANSPORT FACILITIES

Type	Spraying Operations	Evaluation Operations	Mixed or other operations	Total
Four-wheel vehicles	2	36	13	51
Two-wheel vehicles	-	47	31	78
Boats	14	16	3	33
Animals	29	66	-	95
Other	24	24	24	72
Total	69	189	71	329

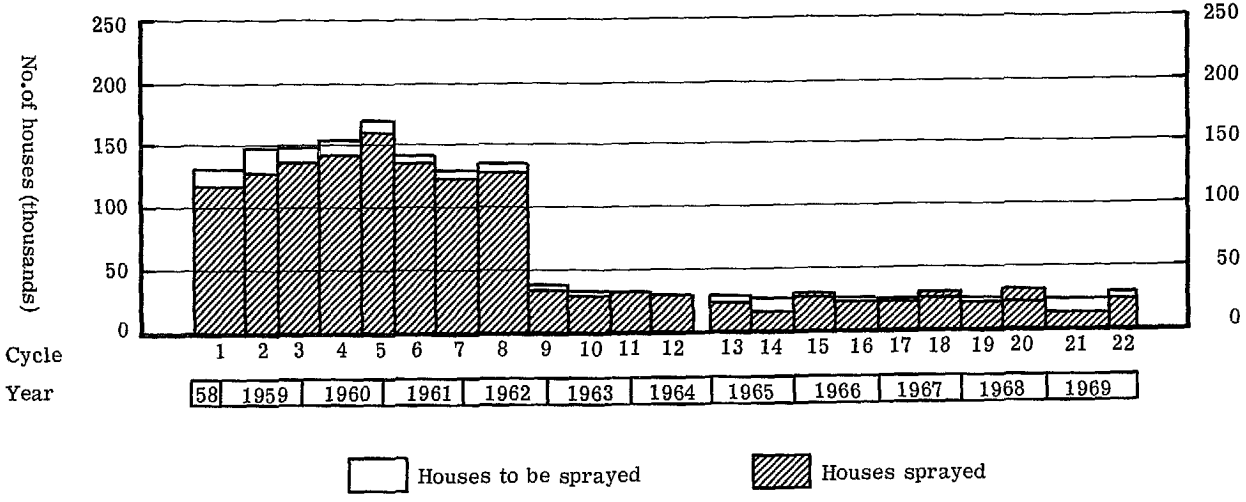
(Part-time personnel in parentheses)

BOLIVIA (Cont.)

SPRAYING OPERATIONS

Year of total coverage	Date	Houses sprayed						Inhabitants directly protected		Insecticide used per house (g. technical)		Average houses sprayed per spray-man/day
		DDT			Dieldrin							
		Cycle	Planned	Sprayed	Cycle	Planned	Sprayed	Planned	Protected	DDT	Dieldrin	
1st	Sep. 58-Aug. 59	1st	131 444	116 572	1st	6 365	10 910	627 362	556 190	362	115	8.3
		2nd	148 200	129 119				691 820	627 210	331		7.0
2nd	Sep. 59-Aug. 60	3rd	147 263	136 601	2nd	11 331	12 268	695 521	634 859	319	118	7.6
		4th	153 514	142 536				692 274	660 185	309		7.2
3rd	Sep. 60-Aug. 61	5th	169 690	159 952	-	-	-	742 902	700 295	331	-	7.6
		6th	142 210	134 173				612 356	577 743	329		7.5
4th	Sep. 61-Sep. 62	7th	129 600	124 623	-	-	-	546 005	524 986	353	-	7.9
		8th	135 474	128 898				551 785	525 005	359		8.6
5th	Oct. 62-Sep. 63	9th	32 561	34 469	-	-	-	124 643	131 962	408	-	6.0
		10th	32 361	28 893				110 578	98 727	428		5.9
6th	Oct. 63-Sep. 64	11th	32 361	32 160	-	-	-	123 923	123 152	533	-	5.3
		12th	28 536	27 509				101 503	97 855	547		5.6
7th	Jan. 65-Dec. 65	13th	26 941	24 634	-	-	-	96 020	87 799	557	-	5.3
		14th	26 941	16 357				94 987	57 671	575		4.1
8th	Jan. 66-Dec. 66	15th	27 130	29 752	-	-	-	97 375	106 787	588	-	4.7
		16th	27 130	23 839				100 023	87 890	617		4.6
9th	Jan. 67-Dec. 67	17th	24 161	24 733[a]	-	-	-	86 980	82 565[a]	654	-	4.9
		18th	24 992	30 254[a]				89 971	90 813[a]	584		4.5
10th	Jan. 68-Dec. 68	19th	24 156	20 861[a]	-	-	-	80 075	79 631[a]	543	-	6.1
		20th	21 387	32 353[a]				70 897	95 240[a]	609		4.7
11th	Jan. 69-Dec. 69	21st	23 886	14 715[a]	-	-	-	84 112	55 933[a]	513	-	7.4
		22nd	28 189	23 035[a]				100 137	114 018	478		7.1

a) Includes emergency sprayings.



EPIDEMIOLOGICAL EVALUATION OPERATIONS, ATTACK PHASE AREAS

Year	Slides examined			Species found		
	Total No	Positive		P. falciparum	P. vivax	P. malariae
		Number	Percentage			
1958[a]	3 426	257	7.5	53	143	61
1959	83 762	1 970	2.4	243	1 419	308
1960	87 775	893	1.0	143	621	129
1961	141 033	782	0.6	58	711	13
1962	159 397	1 089	0.7	378	700	11
1963	117 432	2 241	1.9	906	1 335	-
1964	89 333	3 002	3.4	477	2 525	-
1965	150 800	845	0.6	136	709	-
1966	133 735	1 005	0.8	188	817	-
1967	113 500	811	0.7	95	716	-
1968	97 996	1 170	1.2	288	882	-
1969[b]	119 625	3 024	2.5	716	2 308	-

CONSOLIDATION PHASE AREAS

Year	Estimated population in the area (thousands)	No. of slides examined	% of population sampled (annual rate)	Total No. of positive cases	Origin of infections							Species of parasite		
					Autochthonous	Relapsing	Imported		Induced	Introduced	Not investigated and unclassified	P. falciparum	P. vivax	P. malariae
							from abroad	from areas within country						
1961	461	11 975	2.6	14	1	1	5	7	-	-	-	-	14	-
1962	759	18 131	3.2	21	-	-	2	19	-	-	-	-	21	-
1963	1 179	58 587	7.4	104	18	1	-	73	-	2	10	4	100	-
1964	1 141	66 207	5.8	452	154	7	5	21	-	-	265	20	430	2
1965	1 173	119 954	10.2	96	50	-	8	22	-	-	16	2	92	2
1966	1 202	126 410	10.5	368	209	11	-	59	-	-	89	26	342	-
1967	1 214	101 037	8.3	631	269	1	4	26	-	-	331[c]	105	526	-
1968	1 245	89 639	7.2	828	499	13	7	52	-	-	257	184	644	-
1969[b]	1 174	47 662	4.4	933	463	13	4	33	-	-	420	100	833	-

a) September-December. b) November. c) Includes 1 congenital case.

BRAZIL

STATUS OF MALARIA PROGRAM AT DECEMBER 1969

	Population (thousands)	Area km^2
TOTAL COUNTRY	89 684	8 511 965
Non malarious areas	54 063	1 625 181
Originally malarious areas		
Maintenance phase	804	1 056
Consolidation phase	12 138	169 719
Attack phase	22 679	6 716 009
Preparatory phase	-	-
Total originally malarious areas	35 621	6 886 784

PERSONNEL

Activity	Professional	Non professional	Total
Spraying operations	32	7 849	7 881
Evaluation operations	102	2 365	2 467
Administrative and other	3	1 901	1 904
Transport	-	1 458	1 458
Total	137	13 573	13 710

TRANSPORT FACILITIES[a)]

Type	Spraying Operations	Evaluation Operations	Mixed or other operations	Total
Four-wheel vehicles	-	-	1 397	1 397
Two-wheel vehicles	-	-	810	810
Boats	-	-	476	476
Animals	-	-	3 000	3 000
Other	-	-	5	5
Total	-	-	5 688	5 688

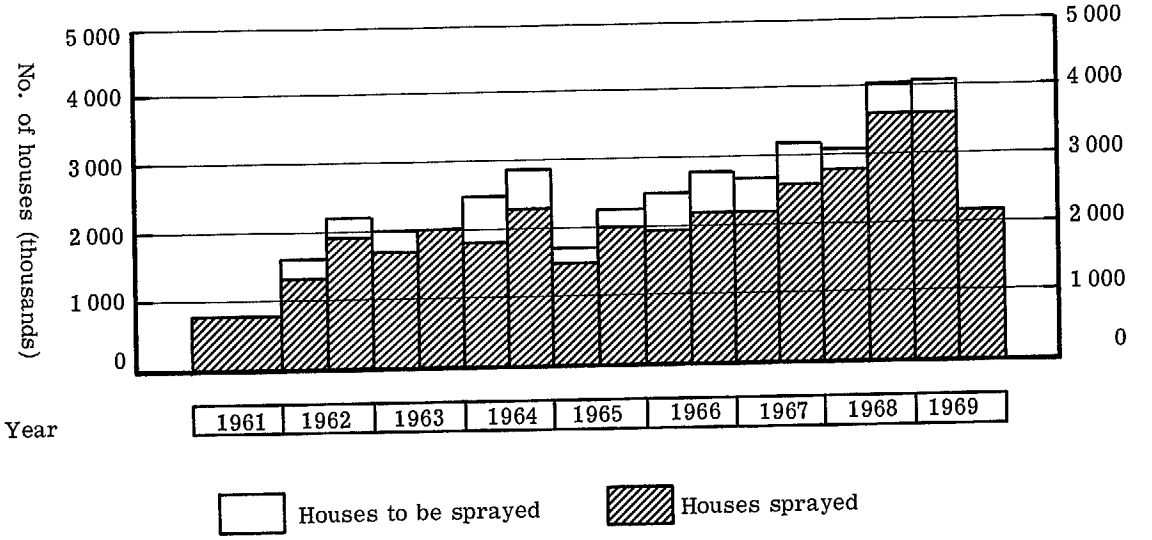
a) Transport facilities are used in epidemiological evaluation and spraying operations activities.

BRAZIL (Excl. São Paulo)

SPRAYING OPERATIONS

Year of total coverage	Date	Cycle DDT	Houses sprayed		Inhabitants directly protected		Insecticide used per house (g. technical) DDT	Average houses sprayed per spray-man/day
			Planned	Sprayed	Planned	Protected		
(a)	Jan. 61-Nov. 61	(a)	820 095	814 475[b]	3 399 300[c]	3 380 000[c]	...	...
(a)	Jan. 62-Jun. 62	...	1 622 052	1 350 566	7 016 997	5 843 075	424	...
	Jul. 62-Dec. 62	...	2 292 000	1 960 358	9 724 956	8 317 433	420	...
(a)	Jan. 63-Jun. 63	...	2 062 265	1 726 289	8 574 898	7 178 751	407	...
	Jul. 63-Dec. 63	...	2 045 534	2 010 035	8 524 558	8 376 676	414	7.5
(a)	Jan. 64-Jun. 64	...	2 532 153	1 899 065	10 502 357	7 876 719	412	7.9
	Jul. 64-Dec. 64	...	2 993 954	2 350 055	12 310 241	9 662 834	419	7.7
(a)	Jan. 65-Jun. 65	...	1 799 354	1 588 551	7 361 157	6 498 902	414	7.7
	Jul. 65-Dec. 65	...	2 388 893	2 092 159	9 364 460	8 201 391	413	7.6
(a)	Jan. 66-Jun. 66	...	2 556 302	1 925 160	9 829 492	7 402 633	408	7.8
	Jul. 66-Dec. 66	...	2 800 000	2 241 208	10 900 000	8 724 032	389	7.4
(a)	Jan. 67-Jun. 67	...	2 741 666	2 276 072	10 323 308[c]	8 833 213	421	7.7
	Jul. 67-Dec. 67	...	3 244 299	2 673 073	12 328 336[c]	10 459 348	447	7.4
(a)	Jan. 68-Jun. 68	...	3 187 958	2 820 339	12 434 919	10 931 796	439	7.5
	Jul. 68-Dec. 68	...	4 077 323	3 682 956	15 899 767	14 721 063	453	7.3
(a)	Jan. 69-Jun. 69	...	4 079 989	3 601 762	...	14 279 724	438	7.6
	Jul. 69-Dec. 69	...	2 222 487	2 266 725	...	8 906 772	437	7.7

a) Owing to different spray cycle timing in different regions, these data refer to the calendar year. b) Sprayings. c) Estimated.



BRAZIL (Excl. São Paulo)(Cont.)

EPIDEMIOLOGICAL EVALUATION OPERATIONS, ATTACK PHASE AREAS

Year	Slides examined			Species found		
	Total No.	Positive		P. falciparum	P. vivax	P. malariae
		Number	Percentage			
1961	230 205	36 912[a]	16.03	3 620	32 285	2
1962	513 767	68 371	13.31	22 683	45 683	5
1963	860 681	109 210	12.69	37 502	71 610	98
1964	1 241 242	109 507	8.82	41 737	67 713	57
1965	1 549 679	108 687	7.01	51 007	57 573	107
1966[b]	1 493 309	106 655	7.14	57 349	49 060	246
1967	1 516 120	100 919	6.65	56 681	44 014	224
1968[c]	1 336 101	79 154	5.92	43 232	35 687	235
1969	1 390 046	55 799	4.01	30 866	24 785	148

CONSOLIDATION PHASE AREAS

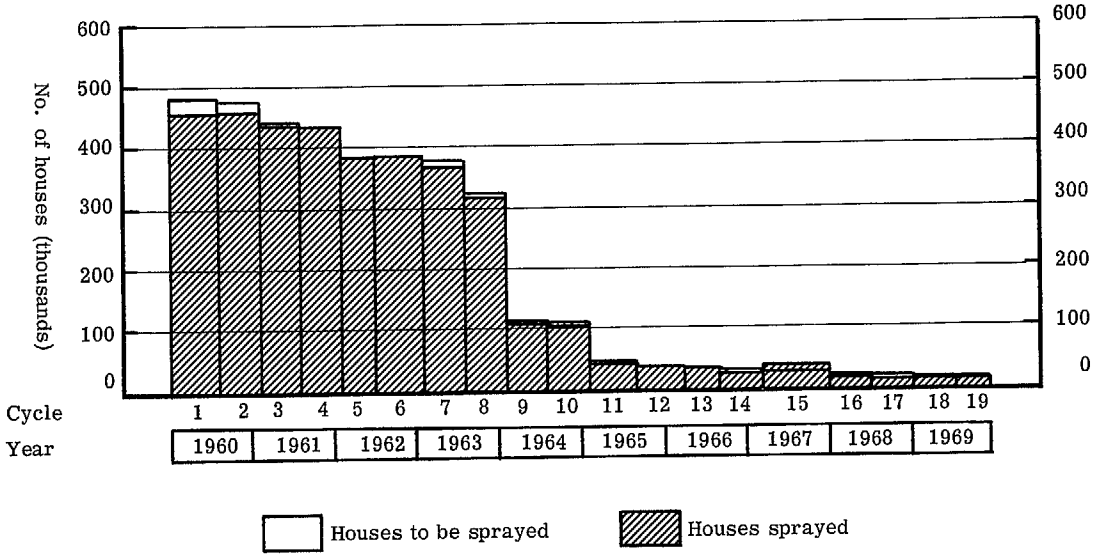
Year	Estimated population in the area (thousands)	No. of slides examined	% of population sampled (annual rate)	Total No. of positive cases	Origin of infections							Species of parasite		
					Autochthonous	Relapsing	Imported		Induced	Introduced	Not investigated and unclassified	P. falciparum	P. vivax	P. malariae
							from abroad	from areas within country						
1965	1 439	132 231	9.2	70	1	1	-	60	-	-	8	14	56	-
1966	2 541	162 102	8.5	228	54	7	-	98	-	-	69	34	194	-
1967	6 000	426 185	7.1	586	171	65	-	157	3	4	186	209	377	-
1968[c]	5 926	537 347	9.1	1 148	261	11	4	542	3	17	310	591	556	1
1969	6 380	554 881	8.7	252	63	2	-	60	2	-	125	100	150	2
MAINTENANCE PHASE AREAS														
1966	733	22 161	4.0	7	-	-	-	7	-	-	-	3	3	1
1967	756	23 588	3.1	9	1	-	-	8	-	-	-	2	7	-
1968[c]	780	19 690	2.5	10	-	-	-	10	-	-	-	-	10	-
1969	804	21 495	2.7	5	-	-	-	4	-	-	1[d]	1	4	-

a) Includes 1 005 undifferentiated mixed infections from Espirito Santo Sector. b) Includes 4th quarter for areas in consolidation and maintenance phases. c) Data for last 2 months not separated by phase. d) Cryptic case.

BRAZIL (São Paulo) (Cont.)

SPRAYING OPERATIONS

Year of total coverage	Date	Cycle DDT	Houses sprayed		Inhabitants directly protected		Insecticide used per house (g. technical) DDT	Average houses sprayed per spray-man/day
			Planned	Sprayed	Planned	Protected		
1st	Jan. 60-Jan. 61	1st	481 533	455 219	2 002 214	1 892 679	433	8.4
		2nd	475 121	458 926	1 992 182	1 924 405	404	9.8
2nd	Feb.61-Jan. 62	3rd	441 104	436 048	1 870 722	1 849 398	416	9.4
		4th	436 057	431 473	1 807 892	1 789 051	412	9.7
3rd	Feb.62-Jan. 63	5th	381 254	380 623	1 605 079	1 602 444	419	9.7
		6th	385 555	383 717	1 558 413	1 550 975	420	9.8
4th	Feb.63-Jan. 64	7th	378 922	366 817	1 525 540	1 477 021	424	9.7
		8th	324 556	316 221	1 346 907	1 312 405	433	9.5
5th	Feb.64-Jan. 65	9th	113 293	110 114	379 362	368 721	444	8.1
		10th	113 257	109 480	449 981	434 974	440	8.3
6th	Feb.65-Mar.66	11th	43 711	43 313	171 413	169 855	436	8.3
		12th	36 050	35 766	139 550	138 459	412	7.8
7th	Mar.66-Jan. 67	13th	35 646	33 407	134 850	126 375	405	8.1
	Jul. 66-Jun. 67	14th	32 523	29 923	123 424	114 484	393	7.8
8th	Feb.67-Dec.67	15th	32 450	42 379	123 310	142 370	388	8.6
	Jan. 68-Jun. 68	16th	22 252	23 910	...	170 314	426	8.5
9th	Jul. 68-Jul. 69	17th	22 252	18 292	...	77 154	401	9.3
		18th	22 522	20 628	86 000	67 973	441	8.0
10th	Aug.69-Dec.69	19th	22 246	18 628	80 000	62 515	408	8.8



EPIDEMIOLOGICAL EVALUATION OPERATIONS, ATTACK PHASE AREAS

Year	Slides examined			Species found		
	Total No.	Positive				
		Number	Percentage	P. falciparum	P. vivax	P. malariae
1960	114 622	8 297	7.2	66	8 230	1
1961	208 502	7 276	3.5	258	7 015	3
1962[a]	370 667	3 689	1.0	227	3 459	3
1963[a]	384 993	2 207	0.6	427	1 778	2
1964	227 608	1 295	0.6	235	1 060	-
1965	52 554	858	1.6	140	717	1
1966	37 502	758	2.0	108	650	-
1967	90 194	1 067	1.2	269	796	2
1968	65 264	434	0.7	205	229	-
1969	35 064	374	1.1	169	204	1

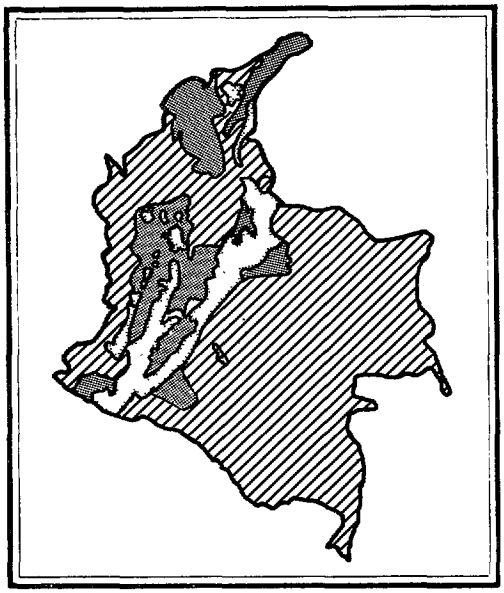
CONSOLIDATION PHASE AREAS

Year	Estimated population in the area (thousands)	No. of slides examined	% of population sampled (annual rate)	Total No. of positive cases	Origin of infections							Species of parasite		
					Autochthonous	Relapsing	Imported		Induced	Introduced	Not investigated and unclassified	P. falciparum	P. vivax	P. malariae
							from abroad	from areas within country						
1964	2 183	307 014	14.1	476	21	15	-	402	-	9	29	69	407	-
1965	3 766	140 491	3.7	691	29	3	-	599	6	10	44	112	579	-
1966	3 974	139 865	3.5	982	295	9	2	622	2	5	47	234	747	1
1967	5 152	95 383	1.9	261	43	1	-	199	2	13	3	105	154	2
1968	5 152[b]	123 277	2.4	578	99	1	4	426	1	1	46	261	317	-
1969	5 758	138 399	2.4	521	100	-	-	376	2	16	27	210	311	-

a) Data for entire State, not separated by attack or consolidation phase. b) 1967 population.

COLOMBIA

STATUS OF MALARIA PROGRAM AT DECEMBER 1969



	Population (thousands)	Area km^2
TOTAL COUNTRY	21 049	1 138 914
Non malarious areas	8 586	168 065
Originally malarious areas		
Maintenance phase	-	-
Consolidation phase	8 580	114 832
Attack phase	3 677	831 391
Preparatory phase	206	24 626
Total originally malarious areas	12 463	970 849

PERSONNEL

Activity	Professional	Non professional	Total
Spraying operations	8	1 172	1 180
Evaluation operations	13	1 009	1 022
Administrative and other	18	285	303
Transport	-	445	445
Total	39	2 911	2 950

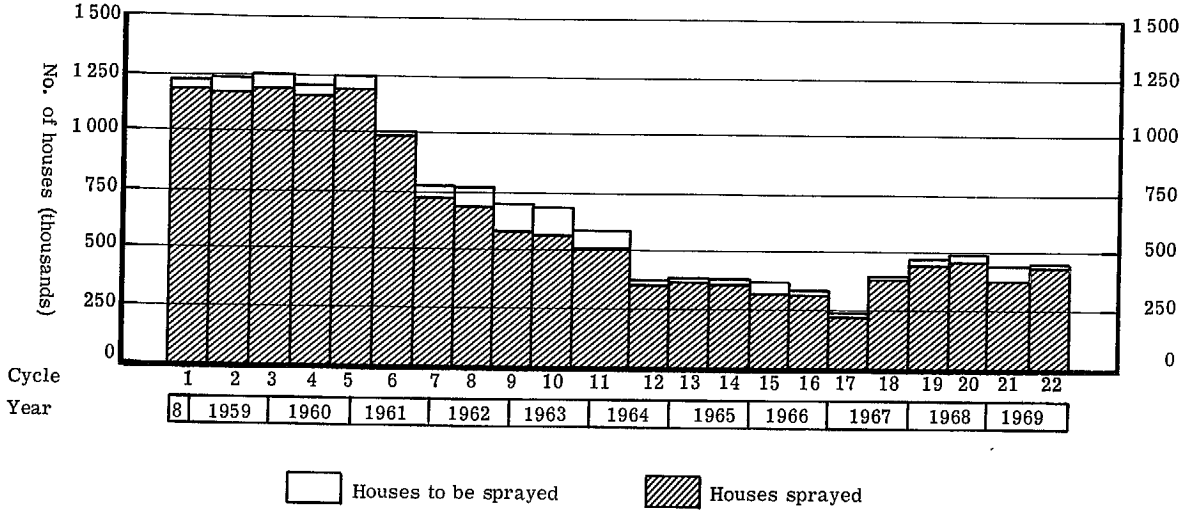
TRANSPORT FACILITIES

Type	Spraying Operations	Evaluation Operations	Mixed or other operations	Total
Four-wheel vehicles	100	53	190	343
Two-wheel vehicles	1	126	19	146
Boats	149	133	66	348
Animals	703	711	89	1 503
Other	47	37	19	103
Total	1 000	1 060	383	2 443

SPRAYING OPERATIONS

Year of total coverage	Date	Cycle DDT	Houses sprayed		Inhabitants directly protected		Insecticide used per house (g. technical) DDT	Average houses sprayed per spray-man/day
			Planned	Sprayed	Planned	Protected		
1st	Oct. 58-Sep. 59	1st	1 235 473	1 181 235	6 900 118	6 597 002	466	6.6
		2nd	1 240 810	1 176 392	6 848 030	6 492 119	425	8.9
2nd	Oct. 59-Sep. 60	3rd	1 273 295	1 196 930	6 915 265	6 500 325	409	9.4
		4th	1 228 550	1 162 059	6 556 771	6 201 358	309	8.7
3rd	Oct. 60-Sep. 61	5th	1 253 594	1 181 557	6 642 794	6 261 680	394	9.7
		6th	1 050 556	945 501[a]	5 320 016	4 788 305	402	9.3
4th	Oct. 61-Sep. 62	7th	796 056	738 459[a]	3 997 793	3 708 400	408	8.9
		8th	789 399	693 315[a]	3 928 049	3 449 630	421	8.8
5th	Oct. 62-Sep. 63	9th	701 762	586 740[b]	3 440 739	2 876 514	435	8.4
		10th	690 726	576 540[b]	3 363 145	2 806 950	459	7.9
6th	Oct. 63-Dec.64	11th	582 580	508 501[b]	2 801 627	2 445 856	437	7.9
		12th	365 843	362 793	1 710 645	1 696 396	602	6.0
7th	Jan. 65-Dec.65	13th	376 662	373 763	1 746 130	1 732 717	630	5.8
		14th	378 869	370 239	1 762 953	1 722 802	589	5.8
8th	Jan. 66-Dec.66	15th	375 005	339 962	1 705 523	1 546 160	572	5.3
		16th	342 605	337 266	1 577 353	1 552 673	590	5.4
9th	Jan. 67-Dec.67	17th	343 363	340 212	1 545 133	1 543 350	595	5.3
		18th	409 174	401 683	1 923 118	1 895 349	534	5.3
10th	Jan. 68-Dec.68	19th	484 075	449 431	2 294 006	2 120 499	567	5.4
		20th	502 051	467 461[c]	2 375 849	2 285 575	455	5.3
11th	Jan. 69-Dec.69	21st	463 187	397 427[d]	2 141 790	1 813 709	529	5.5
		22nd	464 692	451 315[d]	2 146 877	2 098 882	532	5.5

a) Some houses were sprayed in annual cycles. b) Some houses were sprayed in cycles of one, three and four times a year. c) Beginning September some houses were sprayed with 1 g. per m^2. d) In addition, 82 377 houses were sprayed in quarterly cycles and 34 988 houses in consolidation phase.



COLOMBIA (Cont.)

EPIDEMIOLOGICAL EVALUATION OPERATIONS, ATTACK PHASE AREAS

Year	Slides examined			Species found		
	Total No.	Positive		P. falciparum	P. vivax	P. malariae
		Number	Percentage			
1959	329 288	4 172	1.3	1 195	2 942	35
1960	509 920	8 426	1.6	3 758	4 642	26
1961	570 160	16 974	3.0	10 235	6 694	45
1962	626 995	17 350	2.8	9 619	7 697	34
1963	456 592	17 448	3.8	9 113	8 311	24
1964	321 115	13 515	4.2	8 070	5 423	22
1965	174 664	14 729	8.4	9 591	5 125	13
1966	293 472	17 538	6.0	10 392	7 135	11
1967	391 566	22 416	5.7	13 167	9 188	61
1968	477 495	24 869	5.2	14 798	10 050	21
1969	351 586	34 335	9.8	21 237	13 081	17

CONSOLIDATION PHASE AREAS

Year	Estimated population in the area (thousands)	No. of slides examined	% of population sampled (annual rate)	Total No. of positive cases	Origin of infections							Species of parasite		
					Autochthonous	Relapsing	Imported		Induced	Introduced	Not investigated and unclassified	P. falciparum	P. vivax	P. malariae
							from abroad	from areas within country						
1962[a]	3 027	70 250	3.1	147	48	4	-	72	5	-	18	99	48	-
1963	5 305	120 814	2.3	450	83	1	-	279	7	7	73	262	188	-
1964	6 053	178 408	3.0	1 214	224	-	1	774	-	27	188	578	635	1
1965	7 071	316 044	4.7	3 548	464	2	13	2 129	8	4	928	2 002	1 543	3
1966	8 193	362 425	4.4	4 597	1 007	3	23	2 477	3	22	1 062	2 120	2 475	2
1967	8 127	435 945	5.4	4 217	1 274	3	26	2 075	4	31	804	2 459	1 756	2
1968	7 803	381 362	4.9	2 464	419	5	22	1 609	2	14	393	1 166	1 294	4
1969	8 580	416 280	4.9	5 100	457	-	37	3 302	5	8	1 291	2 855	2 245	-

a) April-December.

COSTA RICA

STATUS OF MALARIA PROGRAM AT DECEMBER 1969

	Population (thousands)	Area km^2
TOTAL COUNTRY	1705	50 900
Non malarious areas	1 180	15 454
Originally malarious areas		
Maintenance phase	-	-
Consolidation phase	87	8 451
Attack phase	433	26 995
Preparatory phase	-	-
Total originally malarious areas	520	35 446

PERSONNEL

Activity	Professional	Non professional	Total
Spraying operations	-	150	150
Evaluation operations	3	167	170
Administrative and other	5	38	43
Transport	-	25	25
Total	8	380	388

TRANSPORT FACILITIES

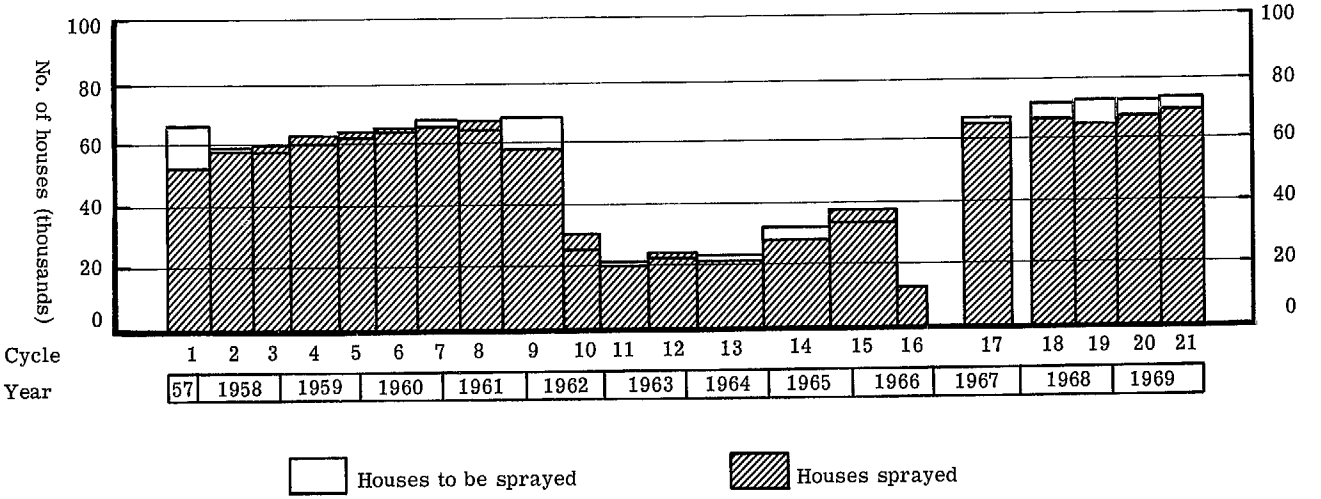
Type	Spraying Operations	Evaluation Operations	Mixed or other operations	Total
Four-wheel vehicles	30	2	7	39
Two-wheel vehicles	151	31	-	182
Boats	40	9	-	49
Animals	24	20	-	44
Other	2	-	-	2
Total	247	62	7	316

COSTA RICA (Cont.)

SPRAYING OPERATIONS

Year of total coverage	Date	Cycle DDT	Houses sprayed		Inhabitants directly protected		Insecticide used per house (g. technical) DDT	Average houses sprayed per spray-man/day
			Planned	Sprayed	Planned	Protected		
1st	Jul. 57-Aug. 58	1st	67 059	53 297	331 070	263 123	464	5.1
		2nd	58 641	58 624	287 634	287 537	419	7.4
2nd	Sep. 58-Sep. 59	3rd	58 858	60 800	282 930	292 856	465	6.9
		4th	60 413	63 063	290 405	303 151	531	7.1
3rd	Oct. 59-Sep. 60	5th	63 259	63 884	302 568	305 586	512	8.6
		6th	64 057	66 961	302 926	316 629	475	9.3
4th	Oct. 60-Sep. 61	7th	68 300	66 242	317 185	307 601	473	9.4
		8th	65 567	68 277	307 903	320 603	485	9.2
5th	Oct. 61-Dec. 62	9th	69 643	58 910	332 545	281 295	492	8.8
		10th	26 075	30 684	120 753	142 102	508	9.6
6th	Jan. 63-Feb. 64	11th	21 582	21 443	99 300	99 083	509	8.6
		12th	22 764	24 003	105 260	110 988	526	8.2
7th	Mar. 64-Oct. 65	13th	23 046	22 098	107 413	102 996	610	8.0
		14th	32 623	29 827[a]	186 395	170 422	727	6.1
8th	Nov. 65-Nov. 66	15th	34 288	38 823[b]	210 665	194 338	116[c]	7.0
		16th[d]	...	13 024[e]	...	58 826	118[c]	7.4
9th	Apr. 67-Nov. 67	17th	67 940	67 323	...	311 829	633	6.3
		(f)	...	10 640	...	48 812	594	7.3
10th	Jan. 68-Dec. 68	18th	72 549	66 751	340 980	327 111	546	5.5
		19th	73 229	65 867	361 972	325 927	542	5.4
11th	Jan. 69-Dec. 69	20th	73 537	68 123[g]	366 279	344 390	560	6.8
		21st	74 725	69 299[g]	374 106	350 340	554	6.4

a) In addition 3 573 houses were sprayed with dieldrin. b) With dieldrin; plus 5 660 emergency sprayings with dieldrin and 1 532 with DDT. c) Dieldrin.
d) Operations suspended. e) With dieldrin; plus 1 396 emergency sprayings with DDT. f) Emergency sprayings. g) Does not include focal sprayings.



COSTA RICA (Cont.)

EPIDEMIOLOGICAL EVALUATION OPERATIONS, ATTACK PHASE AREAS

Year	Slides examined			Species found		
	Total No.	Positive		P. falciparum	P. vivax	P. malariae
		Number	Percentage			
1957	18 136	1 153	6.4	98	1 037	18
1958	36 801	2 139	5.8	151	1 981	7
1959	52 536	1 899	3.6	121	1 775	3
1960	67 643	2 000	3.0	64	1 936	-
1961	87 893	1 673	1.9	18	1 655	-
1962	131 058	1 482	1.1	5	1 476	1
1963	124 475	857	0.7	7	850	-
1964	47 940	566	1.2	-	566	-
1965	95 027	1 846	1.9	1	1 845	-
1966	121 696	2 594	2.1	1	2 593	-
1967	138 486	4 349	3.1	-	4 349	-
1968	115 889	1 156	1.0	-	1 156	-
1969	170 790	679	0.4	-	679	-

CONSOLIDATION PHASE AREAS

Year	Estimated population in the area (thousands)	No. of slides examined	% of population sampled (annual rate)	Total No. of positive cases	Origin of infections							Species of parasite		
					Autochthonous	Relapsing	Imported		Induced	Introduced	Not investigated and unclassified	P. falciparum	P. vivax	P. malariae
							from abroad	from areas within country						
1962[a]	230	52 594	45.7	101	-	15	4	12	-	51	19	-	101	-
1963	255	133 375	52.3	371	244	45	-	7	-	10	65	-	371	-
1964	294	75 345	25.6	646	351	19	2	16	-	1	257	10	636	-
1965	263	102 724	39.1	717	196	3	-	4	-	2	512	3	714	-
1966	276	128 439	46.5	453	154	7	4	13	-	49	226	-	453	-
1967	151	25 623	17.0	94	41	-	-	16	-	-	37	-	94	-
1968	156	26 140	16.8	35	11	5	-	10	-	8	1	-	35	-
1969	87	31 572	36.3	9	1	1	3	1	-	-	3	-	9	-

a) Started in July 1962.

CUBA

STATUS OF MALARIA PROGRAM AT DECEMBER 1969

	Population (thousands)	Area km^2
TOTAL COUNTRY	8 210	110 422
Non malarious areas	5 405	74 621
Originally malarious areas		
Maintenance phase	-	-
Consolidation phase	2 805	35 801
Attack phase	-	-
Preparatory phase	-	-
Total originally malarious areas	2 805	35 801

PERSONNEL

Activity	Professional	Non professional	Total
Spraying operations	-	-	-
Evaluation operations	-	261	261
Administrative and other	-	-	-
Transport	-	-	-
Total	-	261	261

TRANSPORT FACILITIES

Type	Spraying Operations	Evaluation Operations	Mixed or other operations	Total
Four-wheel vehicles	-	67	19	86
Two-wheel vehicles	-	-	-	-
Boats	-	-	-	-
Animals	-	-	-	-
Other	-	-	-	-
Total	-	67	19	86

CUBA (Cont.)

SPRAYING OPERATIONS

Year of total coverage	Date	Cycle DDT	Houses sprayed		Inhabitants directly protected		Insecticide used per house (g. technical) DDT	Average houses sprayed per spray-man/day
			Planned	Sprayed	Planned	Protected		
1st	Jan. 62-Jan. 63	1st	391 155	385 020	2 007 000	1 975 528	210	9. 7
	Jul. 62-Aug. 63	2nd	411 773	389 914	2 125 572	2 012 831	209	10. 0
2nd	Mar. 63-Jul. 64	3rd	432 891	398 940	2 110 456	1 944 936	222	9. 1
	Oct. 63-Mar. 65	4th	440 285	407 546	2 641 710	2 445 886	271	8. 5
3rd	Apr. 64-Sep. 65	5th	454 923	423 361	2 283 531	2 125 145	248	9. 1
	Oct. 64-Dec. 65	6th	460 484	431 349	2 289 065	2 127 888	238	9. 2
4th	Apr. 65-Nov. 66	7th	467 312	438 527	2 315 390	2 172 753	240	8. 9
	Oct. 65-Feb. 67	8th	417 596	320 363	2 084 221	1 569 778	245	8. 9
5th	Apr. 66-Sep. 67	9th	194 000	165 865	747 372	812 739	239	8. 4
	Jan. 67-Dec. 67	10th	...	34 949	...	246 334	220	8. 5
6th	May. 67-Jul. 67	11th[a]	...	8 378	...	37 051	223	6. 6
	Nov. 67-Dec. 67	12th[a]	...	2 191	...	10 171	225	8. 2
7th	Jan. 68-Jul. 68	(b)	-	5 174	-	25 945	-	-
-	Jan. 69-Dec. 69	(b)	-	5 273	-	26 015	-	-

a) Cycle not yet finished. b) Focal sprayings.

CUBA (Cont.)

EPIDEMIOLOGICAL EVALUATION OPERATIONS, ATTACK PHASE AREAS [a]

Year	Slides examined			Species found		
	Total No.	Positive		P. falciparum	P. vivax	P. malariae
		Number	Percentage			
1960[b]	28 791	1 325	4.6	197	1 128	-
1961[b]	91 181	3 230	3.5	128	3 102	-
1962	100 247	3 515	3.5	31	3 484	-
1963	126 334	833	0.7	6	827	-
1964	276 470	624	0.2	-	623	1
1965	423 790	131	0.03	-	131	-
1966[c]	465 199	27	0.01	1	26	-
1967	365 239	41	0.01	10	21	10

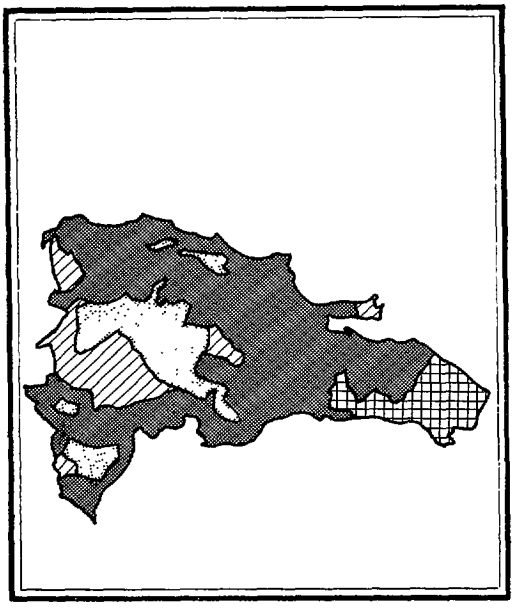
CONSOLIDATION PHASE AREAS

Year	Estimated population in the area (thousands)	No. of slides examined	% of population sampled (annual rate)	Total No. of positive cases	Origin of infections							Species of parasite		
					Autochthonous	Relapsing	Imported		Induced	Introduced	Not investigated and unclassified	P. falciparum	P. vivax	P. malariae
							from abroad	from areas within country						
1966[d]	5 488[e]	236 464[e]	5.2	9	3	-	5	1	-	-	-	4	4	1
1967	2 649	520 075	19.6	5	4	-	1	-	-	-	-	-	5	-
1968	2 734	834 107[f]	30.5	4[f]	-	-	4	-	-	-	-	-	4	-
1969	2 805	746 827[g]	26.6	3[g]	-	1	1	-	1	-	-	-	3	-

a) All areas previously in attack phase transferred to consolidation in 1968. b) Pre-eradication survey. c) Includes information for November and December for areas in consolidation phase. d) January-October. e) Including the non-malarious area and the area that passed into consolidation phase in September. f) Including 239 296 slides and four cases taken in non-malarious areas. g) Including 296 981 slides and three cases taken in non-malarious areas.

DOMINICAN REPUBLIC

STATUS OF MALARIA PROGRAM AT DECEMBER 1969



	Population (thousands)	Area km^2
TOTAL COUNTRY	4 175	48 442
Non malarious areas	33	880
Originally malarious areas		
Maintenance phase	212	4 909
Consolidation phase	3 443	33 394
Attack phase	487	9 259
Preparatory phase	-	-
Total originally malarious areas	4 142	47 562

PERSONNEL

Activity	Professional	Non professional	Total
Spraying operations	1	69	70
Evaluation operations	2	212	214
Administrative and other	1	43	44
Transport	-	40	40
Total	4	364	368

TRANSPORT FACILITIES

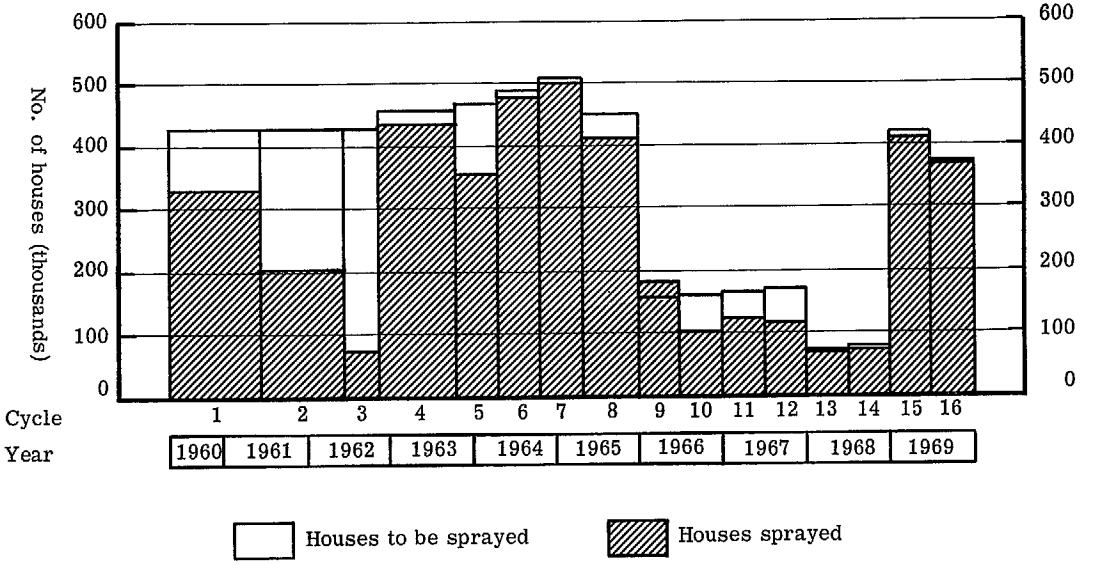
Type	Spraying Operations	Evaluation Operations	Mixed or other operations	Total
Four-wheel vehicles	14	33	34	81
Two-wheel vehicles	-	129	62	191
Boats	-	-	-	-
Animals	-	71	-	71
Other	-	-	-	-
Total	14	233	96	343

DOMINICAN REPUBLIC (Cont.)

SPRAYING OPERATIONS

Year of total coverage	Date	Houses sprayed with DDT						Inhabitants directly protected		Insecticide used per house (g. technical)	Average houses sprayed per spray-man/day
		Twice a year			Once a year						
		Cycle	Planned	Sprayed	Cycle	Planned	Sprayed	Planned	Protected	DDT	
3rd[a]	Mar. 60-Mar. 62	1st 2nd	428 615 428 615	332 944 204 531	-	-	-	2 206 080 2 241 656	1 713 612 1 083 459	495 472	9.0 8.4
(b)	Apr. 62-Oct. 62	3rd	428 615	72 499	-	-	-	2 241 656	368 201	424	8.4
4th	Nov. 62-Mar. 64	4th 5th	462 900 472 000	438 706 359 653	-	-	-	2 530 674 2 428 110	2 398 328 1 850 166	468 475	8.2 8.4
5th	Apr. 64-Mar. 65	6th 7th	490 000 510 575	480 537 500 343	-	-	-	2 316 181 2 315 764	2 271 494 2 269 357	449 355	9.8 10.5
6th	Apr. 65-Jun. 66	8th 9th	450 215 68 444	411 193 68 056	-	- 89 312	- 117 205[c]	2 104 080 728 974	1 921 727 856 077	357 335	10.0 10.4
7th	Jul. 66-Jun. 67	10th 11th	72 769 80 772	77 956 78 252	-	89 312 87 038	25 548 46 259	778 783 671 240	497 333 573 884	339 348	9.5 10.6
8th	Jul. 67-Jun. 68	12th 13th	83 802 73 726	80 271 71 011	-	87 038 -	36 622[c] 118[d]	683 360 346 512[e]	520 388 336 423	363 346	10.3 11.1
9th	Jul. 68-Jun. 69	14th 15th	79 143 77 006	72 675 71 818	-	-	1 093[d] -	371 972[e] 347 189	347 189 341 660	344 365	10.5 10.5
10th	Jul. 69-Dec. 69	16th	68 036	64 371	-	-	-	307 016	311 958	352	9.9

a) Previous coverage with dieldrin. b) Cycle suspended. c) Includes emergency sprayings. d) Emergency sprayings. e) Estimated.



EPIDEMIOLOGICAL EVALUATION OPERATIONS, ATTACK PHASE AREAS

Year	Slides examined			Species found		
	Total No.	Positive		P. falciparum	P. vivax	P. malariae
		Number	Percentage			
1958[a]	17 784	2 676	15.0	...	...	...
1959	28 721	3 743	13.0	1 968	1 767	8
1960	20 337	5 540	27.2	3 583	1 949	8
1961	21 946	2 523	11.5	1 164	1 358	1
1962	19 742	548	2.8	275	271	2
1963	73 352	386	0.5	129	256	1
1964	121 211	321	0.3	103	201	17
1965	205 836	84	0.04	38	41	5
1966	438 291	422	0.1	196	207	19
1967	604 888	117	0.02	54	61	2
1968	213 503	17	0.008	15	2	-
1969	178 322	105	0.06	104	1	-

CONSOLIDATION PHASE AREAS

Year	Estimated population in the area (thousands)	No. of slides examined	% of population sampled (annual rate)	Total No. of positive cases	Origin of infections							Species of parasite		
					Autochthonous	Relapsing	Imported		Induced	Introduced	Not investigated and unclassified	P. falciparum	P. vivax	P. malariae
							from abroad	from areas within country						
1966	319	66 839	21.0	7	4	1	1	1	-	-	-	1	6	-
1967	371	97 632	26.3	10	-	1	9	-	-	-	-	10	-	-
1968	3 321	386 692	11.6	1	-	1	-	-	-	-	-	-	-	1
1969	3 443	395 013	11.5	11	2	8	-	-	1	-	-	2	-	9
MAINTENANCE PHASE AREAS														
1968	208	55 007	26.4	3	-	1	2	-	-	-	-	2	1	-
1969	212	56 360	26.6	8	-	-	-	8	-	-	-	8	-	-

a) June-December.

ECUADOR

STATUS OF MALARIA PROGRAM AT DECEMBER 1969

	Population (thousands)	Area km^2
TOTAL COUNTRY	5 580	291 906
Non malarious areas	2 550	116 444
Originally malarious areas		
Maintenance phase	-	-
Consolidation phase	1 294	27 797
Attack phase	1 736	147 665
Preparatory phase	-	-
Total originally malarious areas	3 030	175 462

PERSONNEL

Activity	Professional	Non professional	Total
Spraying operations	2	601	603
Evaluation operations	9	186	195
Administrative and other	-	105	105
Transport	-	81	81
Total	11	973	984

TRANSPORT FACILITIES

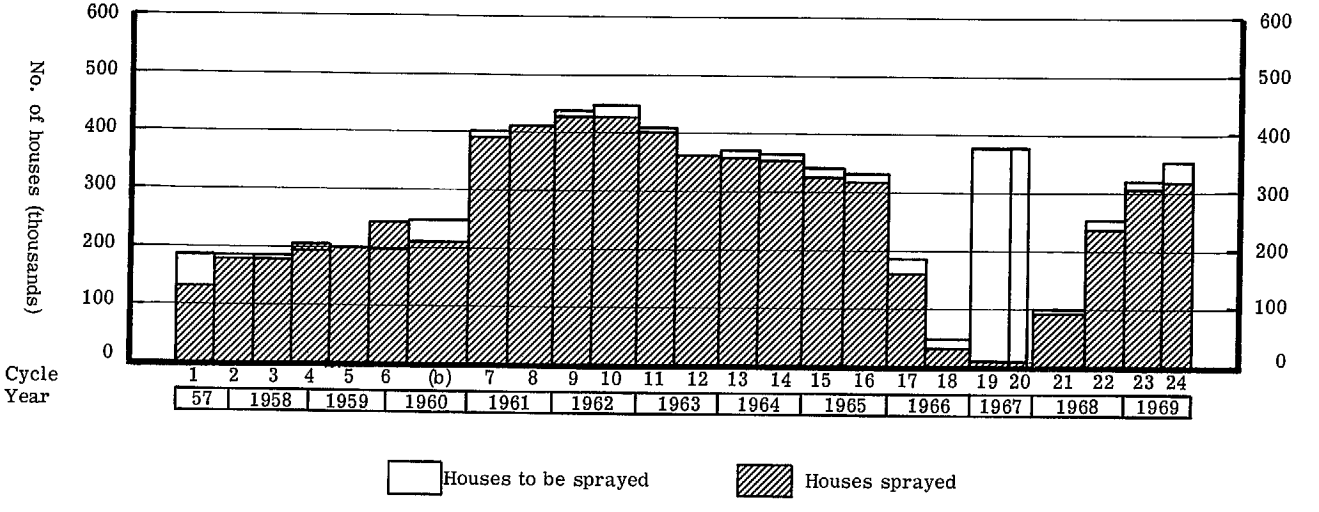
Type	Spraying Operations	Evaluation Operations	Mixed or other operations	Total
Four-wheel vehicles	43	4	63	110
Two-wheel vehicles	-	39	38	77
Boats	-	-	51	51
Animals	-	-	300	300
Other	-	-	70	70
Total	43	43	522	608

ECUADOR (Cont.)

SPRAYING OPERATIONS

Year of total coverage	Date	Houses sprayed						Inhabitants directly protected		Insecticide used per house (g. technical)		Average houses sprayed per spray-man/day
		DDT			Dieldrin							
		Cycle	Planned	Sprayed	Cycle	Planned	Sprayed	Planned	Protected	DDT	Dieldrin	
1st	Mar-57-Mar. 58	1st + 2nd	42 418	63 284	1st	244 304	257 697	1 587 866	1 777 566	590	114	8.0
2nd	Apr. 58-Mar. 59	3rd	48 104	50 089	2nd	280 832	144 069	1 047 229	1 078 629	490	123	6.9
		4th	48 391	83 018			127 348	980 474	1 092 450	436	169	8.5
3rd	Apr. 59-Mar. 60	5th	76 577	72 370	3rd a)	260 539	135 187	949 386	952 664	399	119	9.3
		6th	76 577	97 790 a)			136 542a	995 761	1 128 111	403	122	8.8
(b)	Apr. 60-Dec. 60	(b)	251 768	227 411	-	-	-	1 016 387	918 151	424	-	8.9
4th	Jan. 61-Dec. 61	7th	403 989	394 246	-	-	-	1 954 095	1 907 065	446	-	8.4
		8th	413 951	412 008				1 897 137	1 888 183	502		8.5
5th	Jan. 62-Dec. 62	9th	438 027	428 269	-	-	-	2 069 240	2 023 097	529	-	8.4
		10th	448 716	428 329				2 119 734	2 023 430c)	557		8.2
6th	Jan. 63-Dec. 63	11th	400 362	409 722	-	-	-	2 360 935	2 416 436	581	-	8.2
		12th	363 437	363 304				1 553 330	1 552 883	602		8.2
7th	Jan. 64-Dec. 64	13th	374 284	362 930	-	-	-	1 829 500	1 774 020	620	-	7.8
		14th	367 377	357 206				1 606 760	1 562 305	630		7.9
8th	Jan. 65-Dec. 65	15th	343 390	328 679	-	-	-	1 494 330	1 430 345	627	-	7.5
		16th	330 691	316 519				1 453 023	1 390 756	570		7.7
9th	Jan. 66-Dec. 66	17th	186 353	160 889d)	-	-	-	783 316	676 293	480	-	7.4
		18th	47 478	33 934				193 473	138 300	484		7.3
10th	Jan. 67-Oct. 67	19th	375 411	8 524e)	-	-	-	...	43 856	519	-	6.2
		20th	375 411	6 308e)				...	37 359	547		6.1
11th	Jan. 68-Jan. 69	21st	96 429	91 538f)	-	-	-	412 868	391 841	551	-	5.8
		22nd	254 234	239 429f)				1 247 637	1 103 686	479		6.8
12th	Feb. 69-Dec. 69	23rd	321 655	308 631e)	-	-	-	1 496 262	1 405 607	573	-	7.4
		24th	352 330	290 198e)				1 527 804	1 307 265	591		7.5

a) Cycle suspended. b) Emergency spraying. c) Estimated. d) Not included 21 533 supplementary house-sprayings. e) Not included focal sprayings.
f) Not included 39 527 houses sprayed in consolidation areas.



ECUADOR (Cont.)

EPIDEMIOLOGICAL EVALUATION OPERATIONS, ATTACK PHASE AREAS

Year	Slides examined			Species found		
	Total No.	Positive		P. falciparum	P. vivax	P. malariae
		Number	Percentage			
1957	38 631	1 675	4.3	864	808	3
1958	65 521	4 421	6.7	2 411	2 006	4
1959	98 977	5 887	5.9	2 313	3 571	3
1960	119 562	9 084	7.6	3 158	5 906	20
1961	213 169	9 733	4.6	1 489	8 243	1
1962	269 004	5 531	2.1	658	4 868	5
1963	199 675	3 760	1.9	231	3 509	20
1964	174 203	4 246	2.4	251	3 994	1
1965	160 840	3 731	2.3	178	3 553	-
1966	151 467	4 315	2.8	177	4 138	-
1967[a]	147 476	9 077	6.2	688	8 389	-
1968	198 791	32 383	16.3	3 878	28 493	12
1969	256 852	44 038	17.1	3 849	40 183	6

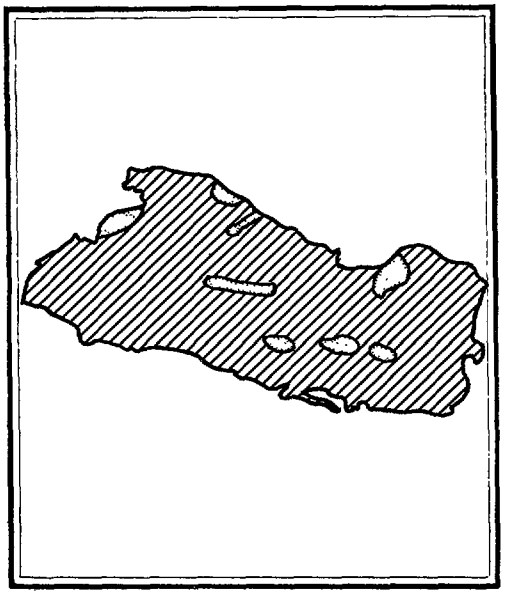
CONSOLIDATION PHASE AREAS

Year	Estimated population in the area (thousands)	No. of slides examined	% of population sampled (annual rate)	Total No. of positive cases	Origin of infections							Species of parasite		
					Autochthonous	Relapsing	Imported		Induced	Introduced	Not investigated and unclassified	P. falciparum	P. vivax	P. malariae
							from abroad	from areas within country						
1963	927	86 778	9.4	97	-	-	-	97	-	-	-	6	90	1
1964	1 053	140 497	13.3	382	36	3	-	198	-	9	136	13	369	-
1965	1 288	179 287	13.9	448	72	20	6	278	1	18	53	25	423	-
1966	1 327	160 354	12.1	661	128	7	-	224	-	23	279	229	432	-
1967[a]	1 336	142 184	10.6	1 688	147	1	-	429	-	10	1 101	268	1 420	-
1968	1 376	151 392	11.0	4 660	190	3	-	1 369	-	8	3 090	318	4 342	-
1969	1 294	164 798	12.7	6 919	479	40	1	2 567	2	88	3 742	468	6 451	-

a) Figures for November not separated by phase.

EL SALVADOR

STATUS OF MALARIA PROGRAM AT DECEMBER 1969



	Population (thousands)	Area km^2
TOTAL COUNTRY	3 322	21 149
Non malarious areas	409	1 849
Originally malarious areas		
Maintenance phase	-	-
Consolidation phase	-	-
Attack phase	2 913	19 300
Preparatory phase	-	-
Total originally malarious areas	2 913	19 300

PERSONNEL

Activity	Professional	Non professional	Total
Spraying operations	1	487	488
Evaluation operations	6	738	744
Administrative and other	2	76	78
Transport	-	158	158
Total	9	1 459	1 468

TRANSPORT FACILITIES

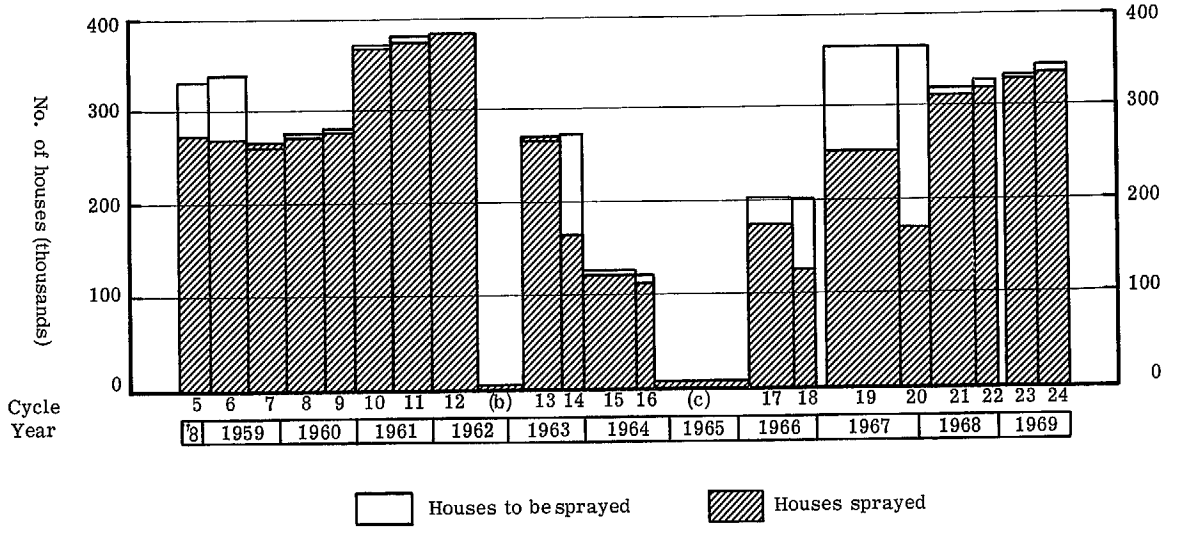
Type	Spraying Operations	Evaluation Operations	Mixed or other operations	Total
Four-wheel vehicles	49	8	48	105
Two-wheel vehicles	-	27	110	137
Boats	1	-	5	6
Animals	-	-	-	-
Other	-	-	-	-
Total	50	35	163	248

EL SALVADOR (Cont.)

SPRAYING OPERATIONS

Year of total coverage	Date	Cycle DDT	Houses sprayed		Inhabitants directly protected		Insecticide used per house (g. technical) DDT	Average houses sprayed per spray-man/day
			Planned	Sprayed	Planned	Protected		
3rd	Aug. 58-Jul. 59	5th[a]	331 975	273 788	1 575 885	1 299 671	493	8.6
		6th	341 277	270 719	1 620 050	1 285 197	527	8.9
4th	Aug. 59-Jul. 60	7th	261 102	265 361	1 237 362	1 257 537	573	7.7
		8th	278 991	276 050	1 289 775	1 277 428	545	7.7
5th	Aug. 60-Jun. 61	9th	281 430	279 481	1 360 400	1 297 262	528	7.6
		10th	368 841	371 715	1 700 000	1 713 252	526	8.9
6th	Jul. 61-Jul. 62	11th	380 283	377 551	1 748 922	1 736 431	546	9.2
		12th	387 944	386 094	1 742 645	1 734 366	562	9.5
(b)	Aug. 62-Feb. 63	(b)	3 901	3 816	20 117	19 680	809	6.7
7th	Mar. 63-Dec. 63	13th	267 239	270 703	1 206 851	1 222 430	559	9.3
		14th	273 344	165 666	1 255 742	761 151	506	9.3
8th	Jan. 64-Nov. 64	15th	127 000	125 854	581 745	576 496	536	8.4
		16th	125 806	114 441	577 568	525 392	533	9.4
(c)	Dec. 64-Feb. 66	(c)	-	6 396	-	...	-	-
9th	Mar. 66-Dec. 66	17th	203 812	175 158	939 492	807 413	602	8.1
		18th	203 812	126 954	928 853	578 583	562	8.7
10th	Feb. 67-Jan. 68	19th	366 344	252 243	1 685 182	1 146 489	596	8.4
		20th	366 343	180 101	1 465 372	770 012	551	8.9
11th	Feb. 68-Dec. 68	21st	318 723	314 565	1 441 928	1 402 421	588	8.6
		22nd	324 888	318 408	1 454 112	1 409 950	562	9.4
12th	Feb. 69-Dec. 69	23rd	334 576	328 778	1 603 899	1 443 932	575	8.4
		24th	335 126	346 004	1 714 893	1 995 751	513	9.2

a) Date in which DDT started to be used; prior to that DDT and dieldrin were used. b) Spraying discontinued; only one locality was sprayed.
c) Emergency spraying.



EL SALVADOR (Cont.)

EPIDEMIOLOGICAL EVALUATION OPERATIONS, ATTACK PHASE AREAS

Year	Slides examined			Species found		
	Total No.	Positive		P. falciparum	P. vivax	P. malariae
		Number	Percentage			
1957	29 171	6 661	22.8	3 001	3 655	5
1958	51 615	9 351	18.1	4 419	4 932	-
1959	71 295	17 521	24.6	4 051	13 470	-
1960	75 381	10 012	13.3	2 947	7 064	1
1961	127 293	12 563	9.9	2 965	9 594	4
1962	194 069	15 433	7.9	2 556	12 873	4
1963	238 791	17 846	7.5	1 879	15 962	5
1964	350 843	25 857	7.4	2 661	23 195	1
1965	506 442	34 070	6.7	2 186	31 884	-
1966	533 047	68 562	12.9	10 703	57 859	-
1967	535 494	82 960	15.5	7 226	75 734	-
1968	692 671	31 526	4.5	968	30 558	-
1969	858 916	25 299	2.9	1 955	23 344	-

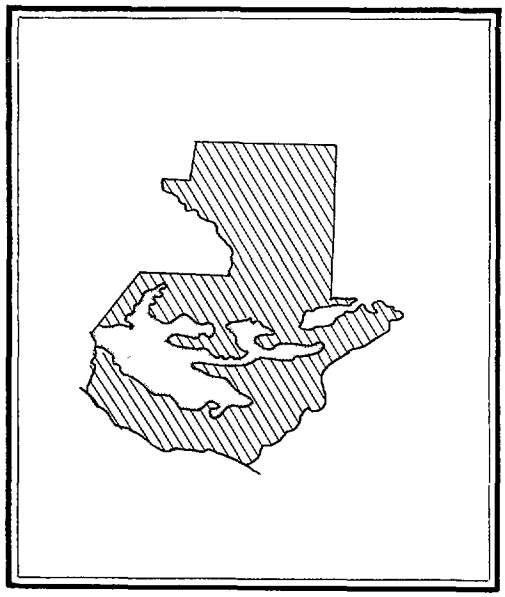
CONSOLIDATION PHASE AREAS

Year	Estimated population in the area (thousands)	No. of slides examined	% of population sampled (annual rate)	Total No. of positive cases	Origin of infections							Species of parasite		
					Autochthonous	Relapsing	Imported		Induced	Introduced	Not investigated and unclassified	P. falciparum	P. vivax	P. malariae
							from abroad	from areas within country						
1968[a]	505[a]	112 640	22.3	4 305	487	592	47	773	-	-	2 406	55	4 250	-

a) Beginning 1969 this area was brought to attack phase.

GUATEMALA

STATUS OF MALARIA PROGRAM AT DECEMBER 1969



	Population (thousands)	Area km^2
TOTAL COUNTRY	5 008	108 889
Non malarious areas	2 716	28 539
Originally malarious areas		
Maintenance phase	-	-
Consolidation phase	-	-
Attack phase	2 292	80 350
Preparatory phase	-	-
Total originally malarious areas	2 292	80 350

PERSONNEL

Activity	Professional	Non professional	Total
Spraying operations	-	514	514
Evaluation operations	4	509 (3)	513 (3)
Administrative and other	1	106	107
Transport	-	71	71
Total	5	1 200 (3)	1 205 (3)

TRANSPORT FACILITIES

Type	Spraying Operations	Evaluation Operations	Mixed or other operations	Total
Four-wheel vehicles	44	-	41	85
Two-wheel vehicles	-	55	245	300
Boats	6	2	3	11
Animals	-	-	-	-
Other	-	-	-	-
Total	50	57	289	396

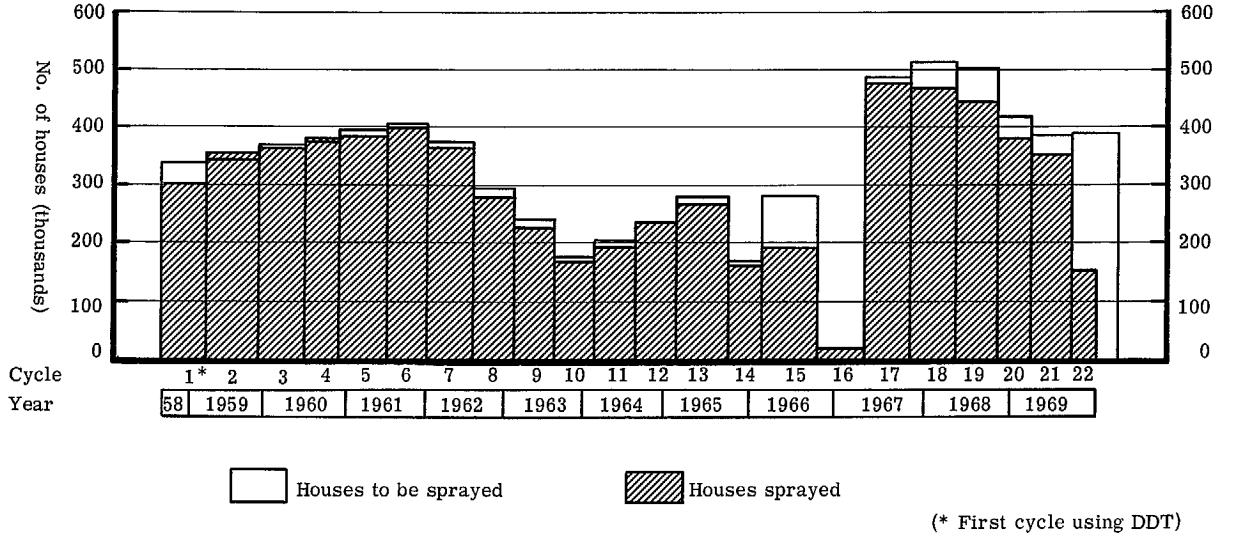
(Part-time personnel in parentheses)

GUATEMALA (Cont.)

SPRAYING OPERATIONS

Year of total coverage	Date	Houses sprayed						Inhabitants directly protected		Insecticide used per house (g. technical)		Average houses sprayed per spray-man/day
		DDT			Dieldrin							
		Cycle	Planned	Sprayed	Cycle	Planned	Sprayed	Planned	Protected	DDT	Dieldrin	
1st	Aug. 56-Aug. 57	-	-	-	1st	308 097	306 306	1 361 175	1 353 121	-	117	8.4
2nd	Sep. 57-Sep. 58	-	-	-	2nd	321 975	331 090	1 422 165	1 462 510	-	117	8.5
3rd	Oct. 58-Oct. 59	1st	341 000	301 329	-	-	-	1 482 670	1 310 317	427	-	8.8
		2nd	342 586	357 104	-	-	-	1 481 342	1 544 144	542	-	7.5
4th	Nov. 59-Nov. 60	3rd	373 641	368 269	-	-	-	1 460 936	1 439 781	541	-	7.1
		4th	377 381	378 636	-	-	-	1 654 816	1 660 207	560	-	8.1
5th	Dec. 60-Dec. 61	5th	396 588	386 737	-	-	-	1 815 183	1 769 971	588	-	7.8
		6th	406 807	393 090	-	-	-	1 737 473	1 678 906	557	-	7.9
6th	Jan. 62-Jan. 63	7th	375 000	368 135	-	-	-	1 562 625	1 534 089	553	-	7.5
		8th	291 490	280 687	-	-	-	1 185 781	1 141 867	589	-	7.5
7th	Feb. 63-Jan. 64	9th	243 511	231 824	-	-	-	949 936	904 382	537	-	7.6
		10th	175 000	171 061	-	-	-	642 950	628 563	502	-	8.0
8th	Feb. 64-Jan. 65	11th	205 686	193 780	-	-	-	748 945	705 594	510	-	8.1
		12th	239 819	239 859	-	-	-	1 060 576	1 060 758	508	-	8.0
9th	Feb. 65-Mar. 66	13th	281 102	268 636[a]	-	-	-	1 067 260	1 019 937	506	-	8.2
		14th	165 071	162 100[b]	-	-	-	697 340	685 083	523	-	8.3
10th	Apr. 66-Feb. 67	15th	282 310	192 058	-	-	-	1 039 183	706 972	557	-	7.8
		16th	...	15 693	-	-	-	...	129 536	542	-	7.7
11th	Feb. 67-Mar. 68	17th[c]	478 038	468 963	-	-	-	1 912 152	1 778 666	550	-	7.7
		18th	511 193	467 976	-	-	-	1 891 414	1 793 133	531	-	7.8
12th	Apr. 68-Mar. 69	19th	500 444	443 408	-	-	-	1 814 885	1 727 243	545	-	7.7
		20th	416 861	378 313	-	-	-	1 499 045	1 439 806	544	-	7.6
13th	Apr. 69-Dec. 69	21st	379 477	350 848	-	-	-	1 346 643	1 354 349	535	-	7.7
		22nd[d]	382 532	148 731	-	-	-	1 348 215	556 700	503	-	7.7

a) 115 204 houses were sprayed in annual cycles and 3 908 in emergency sprayings. b) Includes 5 791 houses sprayed in emergency sprayings.
c) First cycle of 3-Year Plan. d) Cycle not yet finished.



(* First cycle using DDT)

GUATEMALA (Cont.)

EPIDEMIOLOGICAL EVALUATION OPERATIONS, ATTACK PHASE AREAS

Year	Slides examined			Species found		
	Total No.	Positive		P. falciparum	P. vivax	P. malariae
		Number	Percentage			
1956[a]	8 030	2 111	26.3	538	1 573	-
1957	25 232	5 653	22.4	1 837	3 812	4
1958	62 119	12 829	20.6	5 043	7 786	-
1959	108 048	7 894	7.3	1 548	6 346	-
1960	129 741	3 387	2.6	417	2 969	1
1961	219 628	4 083	1.9	780	3 298	5
1962	275 003	5 783	2.1	1 539	4 224	20
1963	216 217	12 270	5.7	4 660	7 565	45
1964	167 261	17 241	10.3	4 293	12 914	34
1965	242 012	11 730	4.8	2 053	9 676	1
1966	352 046	21 371	6.1	3 189	18 179	3
1967	439 192	19 684	4.5	1 377	18 306	1
1968	492 940	10 407	2.1	360	10 047	-
1969	521 336	10 494	2.0	202	10 291	1

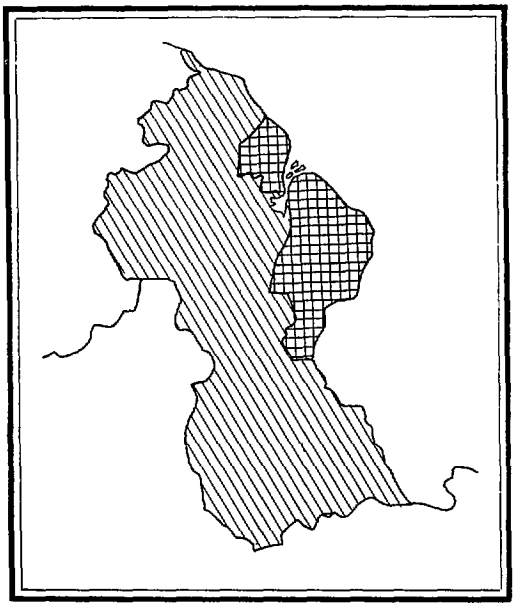
CONSOLIDATION PHASE AREAS

Year	Estimated population in the area (thousands)	No. of slides examined	% of population sampled (annual rate)	Total No. of positive cases	Origin of infections							Species of parasite		
					Autochthonous	Relapsing	Imported		Induced	Introduced	Not investigated and unclassified	P. falciparum	P. vivax	P. malariae
							from abroad	from areas within country						
1962	581	48 370	8.3	213	2	-	-	100	-	-	111	62	151	-
1963	1 234	132 149	10.7	2 846	178	142	-	554	-	2	1 970	897	1 945	4
1964	1 057	121 797	11.5	3 160	154	335	-	511	-	1	2 159	710	2 444	6
1965	887	138 550	15.6	2 742	296	272	-	111	-	-	2 063	260	2 481	1
1966[b]	845	24 393	11.5	674	81	29	1	9	-	-	554	38	636	-

a) August-December. b) Beginning April, consolidation areas reclassified to attack phase.

GUYANA

STATUS OF MALARIA PROGRAM AT DECEMBER 1969



	Population (thousands)	Area km^2
TOTAL COUNTRY	723	215 025
Non malarious areas	-	-
Originally malarious areas		
Maintenance phase	678	39 437
Consolidation phase	-	-
Attack phase	45	175 588
Preparatory phase	-	-
Total originally malarious areas	723	215 025

PERSONNEL

Activity	Professional	Non professional	Total
Spraying operations	-	12	12
Evaluation operations	(1)	34	34 (1)
Administrative and other	-	23	23
Transport	-	19	19
Total	(1)	88	88 (1)

TRANSPORT FACILITIES

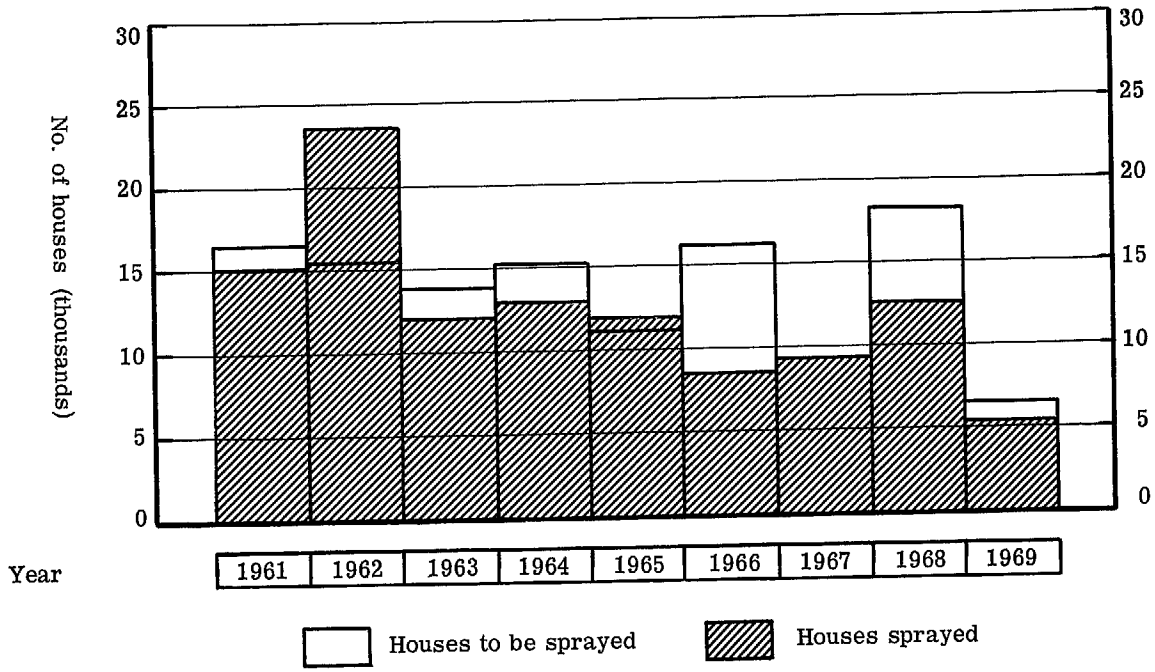
Type	Spraying Operations	Evaluation Operations	Mixed or other operations	Total
Four-wheel vehicles	-	7	3	10
Two-wheel vehicles	-	15	3	18
Boats	-	3	11	14
Animals	-	-	-	-
Other	-	-	-	-
Total	-	25	17	42

(Part-time personnel in parentheses)

GUYANA (Cont.)

SPRAYING OPERATIONS

Year of total coverage	Date	Houses sprayed						Inhabitants directly protected		Insecticide used per house (g. technical)	Average houses sprayed per spray-man/day
		Once a year			Twice a year						
		Cycle	Planned	Sprayed	Cycle	Planned	Sprayed	Planned	Protected	DDT	
...	Jan. 61-Dec. 61	...	16 538	15 107	-	-	-	82 062	74 964	195	4.6
...	Jan. 62-Dec. 62	...	9 542	10 273	...	6 131	13 535	76 563	116 305	183	8.3
...	Jan. 63-Sep. 63	...	6 726	4 270	...	7 218	7 961	68 123	59 542	346	7.3
...	Jan. 64-Dec. 64	...	6 563	5 408	...	4 236 4 236	5 280 2 384	63 243	54 986	295	4.3
...	Jan. 65-Dec. 65	...	6 358	4 361	...	2 341 2 341	2 759 4 001	46 000	47 467	227	4.6
...	Feb. 66-Dec. 66	...	8 217	718	...	3 889 4 619	4 833 3 067	70 362	36 256	461	4.3
...	Feb. 67-Dec. 67	...	-	-	...	... ...	5 075 4 167	... ...	20 972 18 192	318	6.2
...	Jan. 68-Dec. 68	-	-	-	...	12 304 5 979	7 094 5 414	35 053 27 723	35 053 22 606	199	6.5
...	Feb. 69-Dec. 69	-	-	-	...	6 542	5 477	32 033	22 971	310	5.8



EPIDEMIOLOGICAL EVALUATION OPERATIONS, ATTACK PHASE AREAS

Year	Slides examined			Species found		
	Total No.	Positive				
		Number	Percentage	P. falciparum	P. vivax	P. malariae
1958	1 520	51	3.34	23	8	20
1959	3 754	176[a]	4.68	53	100	13
1960	3 674	263[a]	7.16	175	67	12
1961	15 515	218	1.40	57	156	5
1962	14 358	425	2.96	266	159	-
1963	16 780	473[a]	2.81	414	56	-
1964	35 091	223	0.64	190	33	-
1965	22 950	25	0.11	24	1	-
1966	14 098	17	0.12	15	2	-
1967	21 389	175	0.82	145	29	1
1968	32 064	44	0.14	20	24	-
1969	47 966	18	0.04	14	4	-

CONSOLIDATION PHASE AREAS

Year	Estimated population in the area (thousands)	No. of slides examined	% of population sampled (annual rate)	Total No. of positive cases	Origin of infections							Species of parasite		
					Autochthonous	Relapsing	Imported		Induced	Introduced	Not investigated and unclassified	P. falciparum	P. vivax	P. malariae
							from abroad	from areas within country						
1965	26	15 500	59.6	1	1	-	-	-	-	-	-	-	1	-
1966	30	22 141	73.8	882	...	...	...	...	...	...	...	-	882	-

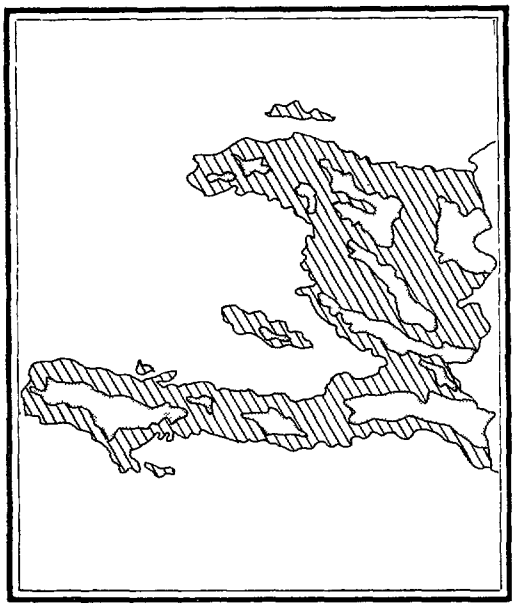
MAINTENANCE PHASE AREAS

1958	430	1	0.0	-	-	-	-	-	-	-	-	-	-	-
1959	460	-	0	-	-	-	-	-	-	-	-	-	-	-
1960	494	-	0	-	-	-	-	-	-	-	-	-	-	-
1961	515	1 374	0.3	13	-	-	1	12	-	-	-	1	12	-
1962	556	21 088	3.8	21	17	3	-	1	-	-	-	-	21	-
1963	572	15 475	2.7	3	-	2	1	-	-	-	-	1	2	-
1964	589	20 094	3.4	2	-	-	2	-	-	-	-	2	-	-
1965	602	23 057	3.8	2	-	-	1	-	-	1	-	2	-	-
1966	627	17 430	2.8	11	...	...	...	...	...	...	...	1	10	-
1967	637	12 774	2.0	-	-	-	-	-	-	-	-	-	-	-
1968	658	23 153	3.5	17	-	-	-	17	-	-	-	7	10	-
1969	678	23 155	3.3	7	-	1	5	1	-	-	-	1	6	-

a) Includes undifferentiated mixed infections.

HAITI

STATUS OF MALARIA PROGRAM AT DECEMBER 1969



	Population (thousands)	Area km^2
TOTAL COUNTRY	4 790	27 750
Non malarious areas	1 210	8 650
Originally malarious areas		
Maintenance phase	-	-
Consolidation phase	-	-
Attack phase	3 580	19 100
Preparatory phase	-	-
Total originally malarious areas	3 580	19 100

PERSONNEL

Activity	Professional	Non professional	Total
Spraying operations	1	44	45
Evaluation operations	10	344	354
Administrative and other	-	121	121
Transport	-	43	43
Total	11	552	563

TRANSPORT FACILITIES

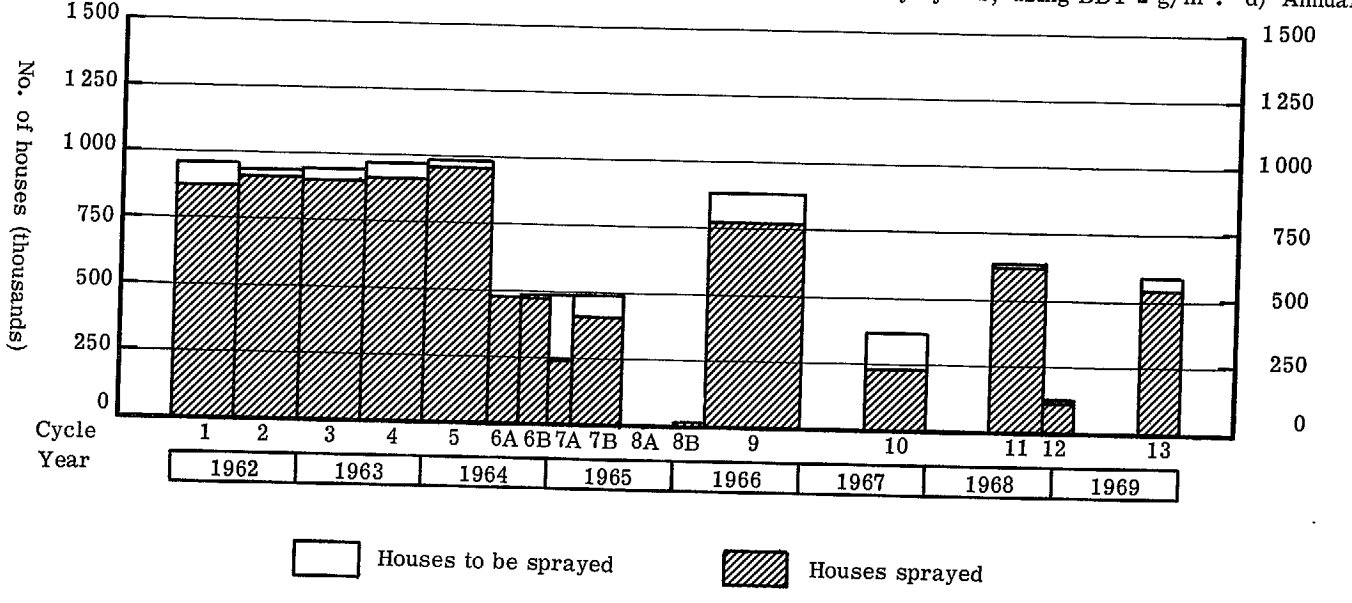
Type	Spraying Operations	Evaluation Operations	Mixed or other operations	Total
Four-wheel vehicles	87	12	27	126
Two-wheel vehicles	-	-	-	-
Boats	2	-	-	2
Animals	-	-	-	-
Other	-	-	-	-
Total	89	12	27	128

HAITI (Cont.)

SPRAYING OPERATIONS

Year of total coverage	Date	Cycle DDT	Houses sprayed		Inhabitants directly protected		Insecticide used per house (g. technical) DDT	Average houses sprayed per spray-man/day
			Planned	Sprayed	Planned	Protected		
1st	Jan. 62-Dec. 62	1st	952 301	885 549 a)	3 490 183	3 245 821	220	14. 3
		2nd	929 415	906 846	3 311 505	3 231 438	196	16. 6
2nd	Jan. 63-Dec. 63	3rd	940 397	902 687	3 297 032	3 165 209	217	15. 4
		4th	964 942	914 340	3 186 238	3 019 259	235	16. 2
3rd	Jan. 64-Dec. 64	5th	984 853	974 136	3 317 674	3 281 609	243	16. 1
		6th A b)	457 066	454 029	1 459 549	1 449 893	127	16. 8
		6th B b)	465 260	455 353	1 446 450	1 446 458	122	17. 5
4th	Jan. 65-Jan. 66	7th A b)	465 907	246 414	1 447 900	765 795	119	18. 3
		7th B c)	465 907	404 692	1 477 205	1 283 123	234	17. 9
		8th A d)	5 657	5 418	21 175	20 280	487	9. 9
		8th B d)	8 178	8 048	27 951	27 508	254	14. 2
5th	Feb. 66-Dec. 66	9th	865 000	772 513	2 881 920	2 573 852	237	14. 8
6th	Jul. 67-Dec. 67	10th	360 049	233 513	...	720 525	295	15. 8
7th	Jul. 68-Jan. 69	11th	647 728	639 266	2 452 000	2 188 271	258	14. 8
		12th	124 814	121 119	452 000	271 305	234	16. 6
8th	Aug. 69-Dec. 69	13th	595 000	549 869	1 617 000	1 685 059	294	15. 2

a) 10 016 houses were sprayed with dieldrin. b) Quarterly cycles, using DDT 1 g/m^2. c) Quarterly cycles, using DDT 2 g/m^2. d) Annual cycles.



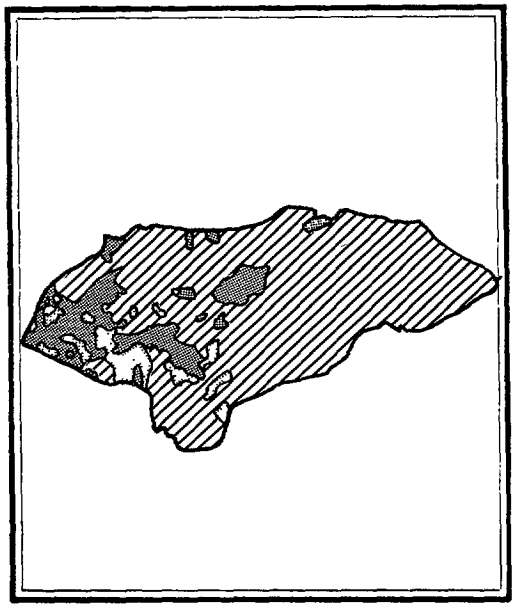
HAITI (Cont.)

EPIDEMIOLOGICAL EVALUATION OPERATIONS, ATTACK PHASE AREAS

Year	Slides examined			Species found		
	Total No.	Positive		P. falciparum	P. vivax	P. malariae
		Number	Percentage			
1962	111 142	4 033	3.6	3 441	20	572
1963	386 657	6 662	1.7	5 464	12	1 186
1964	473 297	19 170	4.1	18 422	24	724
1965	752 284	10 304	1.4	9 997	20	287
1966	2 239 469	8 378	0.4	8 208	35	135
1967	1 343 796	4 871	0.4	4 840	3	28
1968	1 173 905	2 562	0.2	2 556	3	3
1969	686 167	5 005	0.7	4 999	1	5

HONDURAS

STATUS OF MALARIA PROGRAM AT DECEMBER 1969



	Population (thousands)	Area km^2
TOTAL COUNTRY	2 421	112 088
Non malarious areas	308	10 737
Originally malarious areas		
Maintenance phase	-	-
Consolidation phase	648	16 855
Attack phase	1 465	84 496
Preparatory phase	-	-
Total originally malarious areas	2 113	101 351

PERSONNEL

Activity	Professional	Non professional	Total
Spraying operations	1	236	237
Evaluation operations	3	502	505
Administrative and other	31	40	71
Transport	-	81	81
Total	35	859	894

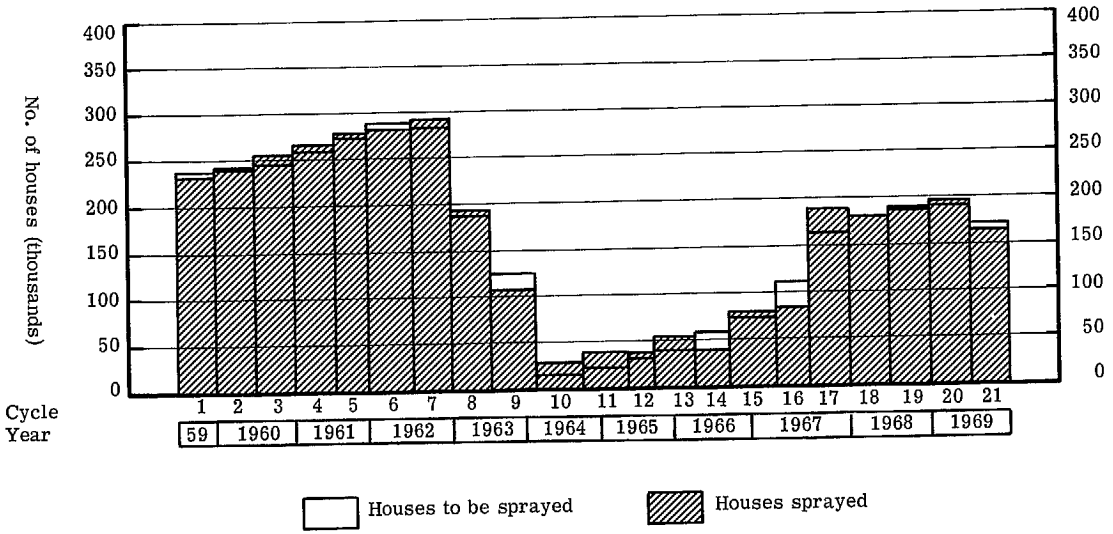
TRANSPORT FACILITIES

Type	Spraying Operations	Evaluation Operations	Mixed or other operations	Total
Four-wheel vehicles	72	22	19	113
Two-wheel vehicles	71	43	-	114
Boats	-	-	4	4
Animals	-	177	32	209
Other	-	1	-	1
Total	143	243	55	441

SPRAYING OPERATIONS

Year of total coverage	Date	Houses sprayed						Inhabitants directly protected		Insecticide used per house (g. technical)		Average houses sprayed per spray-man/day
		DDT			Malathion							
		Cycle	Planned	Sprayed	Cycle	Planned	Sprayed	Planned	Protected	DDT	Malathion	
1st	Jul. 59-Jun. 60	1st	232 771	236 963	-	-	-	1 252 773	1 275 237	406	-	9.8
		2nd	241 726	242 059				1 277 280	1 279 148	368		11.4
2nd	Jul. 60-Jun. 61	3rd	245 572	254 699	-	-	-	1 274 028	1 321 450	369	-	11.8
		4th	258 519	265 825				1 314 052	1 351 212	419		10.9
3rd	Jul. 61-Jun. 62	5th	276 458	277 941	-	-	-	1 401 919	1 409 325	360	-	11.1
		6th	287 516	285 394				1 421 192	1 410 773	262		11.3
4th	Jul. 62-Jun. 63	7th	282 186	290 056	-	-	-	1 376 785	1 415 286	373	-	11.1
		8th	187 905	191 321				877 892	893 861	377		11.0
5th	Jul. 63-Aug. 64	9th	126 499	110 612	1st	19 776	20 440	781 085	712 355	404	440	10.5
					2nd	17 471	18 286				343	
		10th	14 851	27 719	3rd	21 499	23 066	171 805	240 031	505	575	9.0
6th	Sep. 64-Jun. 65	11th	21 502	37 818	4th	23 274	23 614	328 950	425 513	567	550	8.4
					5th	22 039	24 997				411	
		12th	30 377	35 603	-	-	-	137 790	161 522	474	-	8.7
7th	Jul. 65-Jun. 66	13th	38 035	54 654	-	-	-	182 636	262 338	464	-	8.9
		14th	59 178	38 187				291 630	188 187	481		8.8
8th	Jul. 66-Jun. 67	15th	76 185	79 491	-	-	-	375 410	391 701	441	-	8.4
		16th	113 469	83 915				544 651	410 160	490		8.2
9th	Jul. 67-Jun. 68	17th	164 594	189 567	-	-	-	806 510	1 015 546	500	-	7.4
		18th	181 273	181 190[a]			3 957[a]	891 863	891 903	475		8.5
10th	Jul. 68-Jun. 69	19th	186 143	186 861	-	-	10 060[a]	915 823	918 403	482	-	8.5
		20th	191 937	195 462			6 109[a]	977 310	932 976	449		8.1
11th	Jul. 68-Jun. 69	21st	171 288	164 954	-	-	8 670[a]	856 440	795 210	349	-	8.0

a) Emergency spraying with DDT.



HONDURAS (Cont.)

EPIDEMIOLOGICAL EVALUATION OPERATIONS, ATTACK PHASE AREAS

Year	Slides examined			Species found		
	Total No.	Positive		P. falciparum	P. vivax	P. malariae
		Number	Percentage			
1958a)	14 183	906	6.4	339	567	-
1959	66 391	6 675	10.1	3 170	3 504	1
1960	109 677	5 517	5.0	1 737	3 780	-
1961	164 965	4 334	2.6	861	3 472	1
1962	229 666	5 747	2.5	597	5 150	-
1963	168 647	6 721	4.0	669	6 052	-
1964	75 286	5 392	7.2	604	4 788	-
1965	113 763	5 082	4.5	141	4 941	-
1966	165 563	13 299	8.0	1 146	12 153	-
1967	296 498	14 324	4.8	832	13 492	-
1968	359 674	13 337	3.7	3 897	9 440	-
1969	432 895	28 318	6.5	5 144	23 174	-

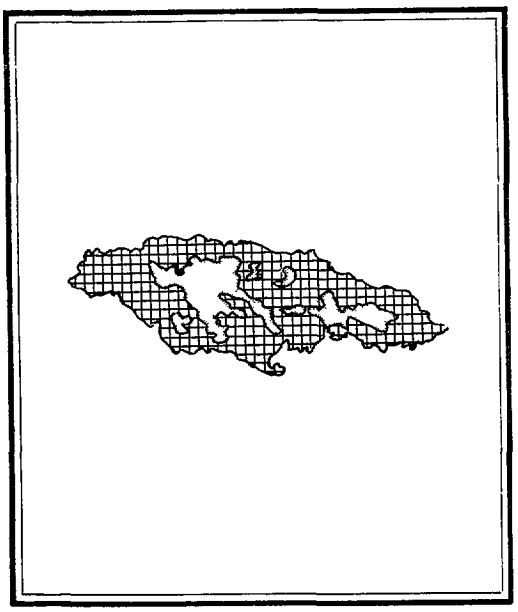
CONSOLIDATION PHASE AREAS

Year	Estimated population in the area (thousands)	No. of slides examined	% of population sampled (annual rate)	Total No. of positive cases	Origin of infections							Species of parasite		
					Autochthonous	Relapsing	Imported		Induced	Introduced	Not investigated and unclassified	P. falciparum	P. vivax	P. malariae
							from abroad	from areas within country						
1962	46	9 989	43.4	3	-	1	-	2	-	-	-	-	3	-
1963	941	95 484	10.1	356	177	51	1	84	-	-	43	19	337	-
1964	1 631	131 696	8.1	1 281	711	258	-	143	-	-	169	37	1 244	-
1965	1 518	196 538	13.0	1 870	1 010	222	32	111	-	-	495	22	1 848	-
1966	1 563	195 239	12.5	3 816	1 178	193	16	156	-	-	2 273	58	3 758	-
1967	1 091	169 100	15.5	1 828	814	223	47	304	-	-	440	40	1 788	-
1968	1 124	225 022	20.0	2 329	1 015	147	31	242	-	-	894	384	1 945	-
1969	648	158 649	24.5	1 266	552	60	33	95	-	-	526	229	1 037	-

a) Inclomplete information.

JAMAICA

STATUS OF MALARIA PROGRAM AT DECEMBER 1969



	Population (thousands)	Area km^2
TOTAL COUNTRY	1 913	11 428
Non malarious areas	383	1 400
Originally malarious areas		
Maintenance phase	1 530	10 028
Consolidation phase	-	-
Attack phase	-	-
Preparatory phase	-	-
Total originally malarious areas	1 530	10 028

PERSONNEL

Activity	Professional	Non professional	Total
Spraying operations	-	-	-
Evaluation operations	3	63	66
Administrative and other	-	23	23
Transport	-	37	37
Total	3	123	126

TRANSPORT FACILITIES

Type	Spraying Operations	Evaluation Operations	Mixed or other operations	Total
Four-wheel vehicles	-	12	26	38
Two-wheel vehicles	-	-	-	-
Boats	-	-	2	2
Animals	-	-	-	-
Other	-	-	-	-
Total	-	12	28	40

EPIDEMIOLOGICAL EVALUATION OPERATIONS, ATTACK PHASE AREAS

Year	Slides examined			Species found		
	Total No.	Positive		P. falciparum	P. vivax	P. malariae
		Number	Percentage			
1958	56 266	205	0.4	199	-	6
1959	39 726	371	0.9	352	-	19
1960	136 123	133	0.1	122	-	11
1961	153 237	23	0.02	16	-	7

CONSOLIDATION PHASE AREAS

Year	Estimated population in the area (thousands)	No. of slides examined	% of population sampled (annual rate)	Total No. of positive cases	Origin of infections							Species of parasite		
					Autochthonous	Relapsing	Imported		Induced	Introduced	Not investigated and unclassified	P. falciparum	P. vivax	P. malariae
							from abroad	from areas within country						
1960[a]	313	48 411	30.9	2	-	2	-	-	-	-	-	-	-	2
1961	761	139 664	18.4	8	1	7	-	-	-	-	-	-	-	8
1962	1 282	246 592	19.2	2	-	-	1	-	1	-	-	-	1	1
1963	1 309	185 459	14.2	3	-	3	-	-	-	-	-	-	-	3
1964	1 365	134 824	9.9	1	-	1	-	-	-	-	-	-	-	1
1965	1 432	24 443	6.8	1	-	1	-	-	-	-	-	-	-	1
MAINTENANCE PHASE AREAS														
1965	1 432	53 854	5.0	2	-	1	1	-	-	-	-	-	-	2
1966	1 471	123 799	8.4	2	-	-	2	-	-	-	-	2	-	-
1967	1 500	122 007	8.1	2	-	-	2	-	-	-	-	1	1	-
1968	1 530	99 581	6.5	2	-	-	2	-	-	-	-	1	1	-
1969	1 530	54 227	3.5	0	-	-	-	-	-	-	-	-	-	-

a) Consolidation phase began in July 1960.

MEXICO

STATUS OF MALARIA PROGRAM AT DECEMBER 1969

	Population (thousands)	Area km^2
TOTAL COUNTRY	45 860	1 967 183
Non malarious areas	23 104	817 183
Originally malarious areas		
Maintenance phase	-	-
Consolidation phase	13 817	575 767
Attack phase	8 939	574 233
Preparatory phase	-	-
Total originally malarious areas	22 756	1 150 000

PERSONNEL

Activity	Professional	Non professional	Total
Spraying operations	35	1 392	1 427
Evaluation operations	55	1 653	1 708
Administrative and other	2	509	511
Transport	-	151	151
Total	92	3 705	3 797

TRANSPORT FACILITIES

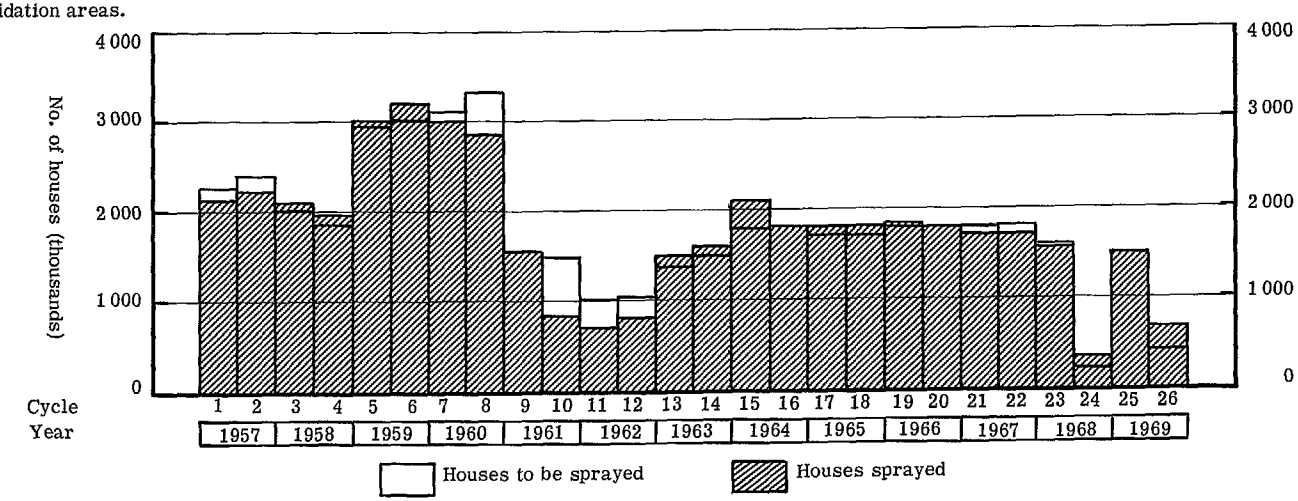
Type	Spraying Operations	Evaluation Operations	Mixed or other operations	Total
Four-wheel vehicles	412	338	146	896
Two-wheel vehicles	-	-	-	-
Boats	21	-	-	21
Animals	1 535	667	-	2 202
Other	-	-	-	-
Total	1 968	1 005	146	3 119

MEXICO (Cont.)

SPRAYING OPERATIONS

Year of total coverage	Date	Houses sprayed						Inhabitants directly protected		Insecticide used per house (g. technical)		Average houses sprayed per spray-man/day
		DDT			Dieldrin							
		Cycle	Planned	Sprayed	Cycle	Planned	Sprayed	Planned	Protected	DDT	Dieldrin	
1st	Jan. 57-Dec. 57	1st	2 292 841	2 143 023	1st	(a)	219 662	10 464 526	10 802 292	495	99	9.3
		2nd	2 434 486	2 298 952			459 064	11 113 428	12 597 171	417		9.9
2nd	Jan. 58-Dec. 58	3rd	2 060 985	2 103 570	2nd	731 872	685 814	12 545 513	12 531 599	402	110	10.3
		4th	1 869 911	1 971 557		666 929	531 742	11 362 506	11 212 496	424	113	10.5
3rd	Jan. 59-Dec. 59	5th	2 973 820	3 050 952	3rd	321 520	246 753	14 492 905	14 505 650	434	112	10.8
		6th	3 018 184	3 219 340		160 136	45 548	14 226 160	14 614 270	434	118	10.4
4th	Jan. 60-Dec. 60	7th	3 177 380	3 027 089	4th	68 977	21 390	14 163 856	13 301 924	369	94	10.9
		8th	3 376 695	2 869 083		(a)	1 000	14 681 870	12 481 041	247	83	11.1
5th	Jan. 61-Dec. 61	9th	1 575 106	1 582 503	-	-	-	6 571 342	6 602 052	356	-	11.2
		10th	1 575 106	852 287				6 409 106	3 468 283	414		10.5
6th	Jan. 62-Dec. 62	11th	1 036 386	783 060[b]	-	-	-	4 151 927	3 135 873	514	-	8.6
		12th	1 036 386	825 082				4 070 924	3 241 041	517		8.9
7th	Jan. 63-Dec. 63	13th	1 477 793	1 551 297[b]	-	-	-	5 686 547	5 969 938	512	-	8.6
		14th	1 477 793	1 606 125[b]				5 572 757	6 056 473	...		8.7
8th	Jan. 64-Dec. 64	15th	1 808 906	2 190 136[c]	-	-	-	6 869 682	8 317 653	486	-	8.7
		16th	1 808 906	1 848 155[c]				6 770 916	6 917 988	476		8.7
9th	Jan. 65-Dec. 65	17th	1 770 934	1 824 675[c]	-	-	-	6 278 670	6 469 365	423	-	9.4
		18th	1 770 934	1 812 043[c]				5 949 098	6 087 346	408		9.3
10th	Jan. 66-Dec. 66	19th	1 842 180	1 874 530[d]	-	-	-	6 482 447	6 596 302	420	-	9.4
		20th	1 842 180	1 839 992[d]				6 202 620	6 195 335	410		9.1
11th	Jan. 67-Dec. 67	21st	1 814 243	1 781 299[d]	-	-	-	6 350 024	6 586 286	407	-	9.2
		22nd	1 814 243	1 734 073[d]				6 350 024	6 217 836	405		9.2
12th	Jan. 68-Dec. 68	23rd	1 613 582	1 611 594	-	-	-	7 321 030	6 088 368	412	-	9.2
		24th	235 852	361 518				1 583 857	946 966	397		8.8
13th	Jan. 69-Dec. 69	25th	1 515 935	1 526 901[e]	-	-	-	5 685 501	5 028 887	482	-	9.3
		26th	407 363	609 871[e]				1 544 842	1 415 511	551		8.6

a) Included in DDT column. b) Including houses sprayed once and three times a year. c) Including houses sprayed once, three and four times a year. d) Including houses sprayed once and three times a year, and some sprayed with BHC. e) Includes houses sprayed once a year and focal sprayings in consolidation areas.



MEXICO (Cont.)

EPIDEMIOLOGICAL EVALUATION OPERATIONS, ATTACK PHASE AREAS

Year	Slides examined			Species found		
	Total No.	Positive		P. falciparum	P. vivax	P. malariae
		Number	Percentage			
1957	175 080	4 387	2.51	514	3 856	17
1958	399 124	3 290	0.82	487	2 779	24
1959	815 038	3 202	0.39	443	2 705	54
1960	1 208 712	3 569	0.29	245	3 251	73
1961	828 360	8 735	1.05	337	8 283	115
1962	727 262	9 642	1.33	139	9 450	53
1963	710 448	12 906	1.82	279	12 581	46
1964	761 832	11 722	1.54	371	11 334	17
1965	787 301	8 559	1.09	44	8 506	9
1966	862 888[a]	10 054[a]	1.17	79	9 966	9
1967	796 135	13 515	1.70	41	13 468	6
1968	1 418 672	22 486	1.59	232	22 134	120
1969	1 497 730	46 743	3.12	46	46 591	106

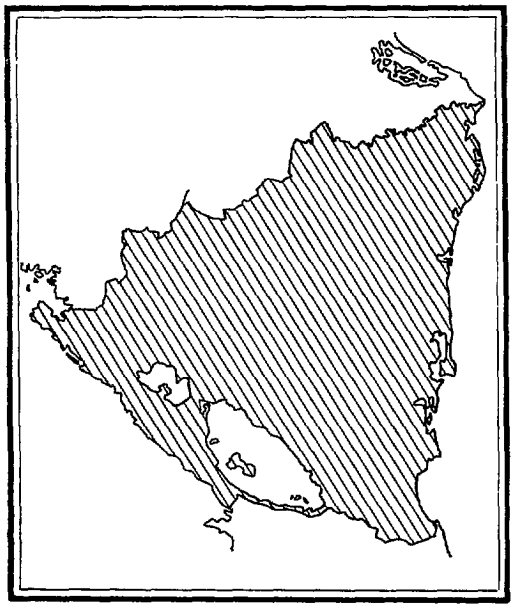
CONSOLIDATION PHASE AREAS

Year	Estimated population in the area (thousands)	No. of slides examined	% of population sampled (annual rate)	Total No. of positive cases	Origin of infections							Species of parasite		
					Autochthonous	Relapsing	Imported		Induced	Introduced	Not investigated and unclassified	P. falciparum	P. vivax	P. malariae
							from abroad	from areas within country						
1958	59	4 449	7.5	-	-	-	-	-	-	-	-	-	-	-
1959	59	6 560	11.1	-	-	-	-	-	-	-	-	-	-	-
1960	70	4 058	7.7	-	-	-	-	-	-	-	-	-	-	-
1961	11 721	745 907	6.4	3 114	1 248	446	387		12	90	931	91	3 004	19
1962	15 592	1 240 130	7.9	4 367	1 211	487	3	695	2	642	1 597	43	4 577	17
1963	16 830	1 122 103	6.7	3 835	1 514	73	1	494	5	390	1 358	183	3 634	18
1964	12 740	833 491	6.5	1 683	914	78	2	407	4	11	267	83	1 595	5
1965	12 995	808 202	6.2	1 554	601	30	9	298	-	21	595	26	1 527	1
1966	12 794	709 154	5.5	1 158	579	132	6	231	2	2	206	1	1 155	2
1967	13 357	675 708	5.1	1 648	716	336	17	351	2	15	211	3	1 642	3
1968	13 574	988 165	7.3	3 554	2 128	407	3	380	15	8	613	4	3 535	15
1969	13 817	1 026 330	7.4	5 383	1 511	281	1	374	5	11	3 200	3	5 367	13

a) Including 58 269 slides with 188 positives from non-malarious areas adjoining areas under attack phase.

NICARAGUA

STATUS OF MALARIA PROGRAM AT DECEMBER 1969



	Population (thousands)	Area km^2
TOTAL COUNTRY	1 872	127 358
Non malarious areas	-	9 000
Originally malarious areas		
Maintenance phase	-	-
Consolidation phase	-	-
Attack phase	1 872	118 358
Preparatory phase	-	-
Total originally malarious areas	1 872	118 358

PERSONNEL

Activity	Professional	Non professional	Total
Spraying operations	2	351	353
Evaluation operations	4	688	692
Administrative and other	1	77	78
Transport	-	113	113
Total	7	1 229	1 236

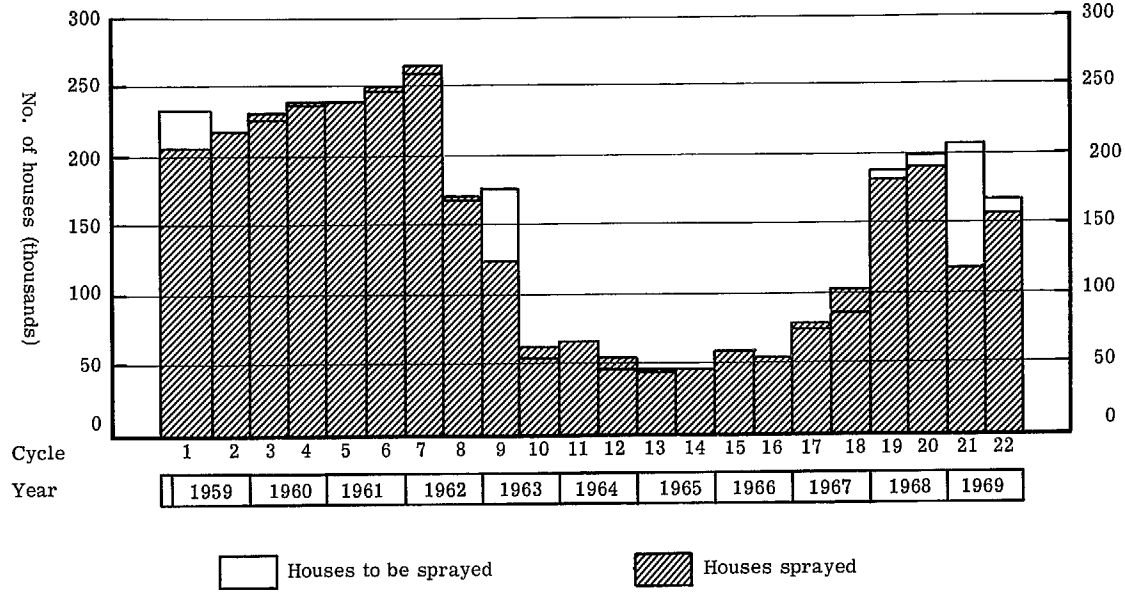
TRANSPORT FACILITIES

Type	Spraying Operations	Evaluation Operations	Mixed or other operations	Total
Four-wheel vehicles	-	1	86	87
Two-wheel vehicles	-	-	57	57
Boats	-	-	47	47
Animals	-	-	-	-
Other	-	-	43	43
Total	-	1	233	234

SPRAYING OPERATIONS

Year of total coverage	Date	Houses sprayed						Inhabitants directly protected		Insecticide used per house (g. technical)		Average houses sprayed per spray-man/day
		DDT			Malathion							
		Cycle	Planned	Sprayed	Cycle	Planned	Sprayed	Planned	Protected	DDT	Malathion	
1st	Nov.58-Dec. 59	1st	223 220	205 930	-	-	-	1 244 452	1 148 052	401	-	9.2
		2nd	218 312	218 645				1 202 244	1 204 139	325		10.3
2nd	Jan. 60-Dec. 60	3rd	226 831	230 478	-	-	-	1 232 373	1 252 160	376	-	9.4
		4th	237 553	239 076				1 275 185	1 283 375	396		8.9
3rd	Jan. 61-Dec. 61	5th	237 062	239 375	-	-	-	1 244 338	1 256 399	403	-	9.5
		6th	248 739	249 068			2 469	1 276 530	1 290 900	396	410	9.2
4th	Jan. 62-Dec. 62	7th	259 760	259 743	(a)	...	5 079	1 289 708	1 314 866	409	309	9.6
		8th	163 746	164 623		5 372	5 710	821 913	827 823	440	399	9.3
5th	Jan. 63-Dec. 63	9th	170 580	115 023	(a)	5 958	11 460	863 624	618 699	465	420	9.0
		10th	55 574	59 876		9 320	11 356	279 693	306 925	471	439	9.0
6th	Jan. 64-Dec. 64	11th	65 151	55 884	(a)	9 445	12 098	337 690	307 741	491	473	8.3
		12th	34 068	37 139		11 375	16 925	187 480	223 046	493	409	7.7
7th	Jan. 65-Dec. 65	13th	32 752	33 998	(a)	14 817	12 653	206 178	202 201	476	429	7.9
		14th	33 124	30 010		11 343	14 953	189 793	191 910	436	425	8.5
8th	Jan. 66-Dec. 66	15th	39 458	38 452	(a)	18 844	18 239	275 698	268 086	423	362	8.3
		16th	35 808	36 793		18 844	16 447	261 914	255 149	420	380	8.3
9th	Jan. 67-Dec. 67	17th	59 766	56 652	(a)	19 203	17 634	379 051	376 386	414	374	8.4
		18th	67 305	86 055		19 203	17 081	415 238	518 110	410	375	8.3
10th	Jan. 68-Dec. 68	19th	167 410	166 684	(a)	19 702	16 168	787 899	932 662	429	384	8.2
		20th	178 831	171 831		20 756	19 735	862 107	964 796	403	282	8.8
11th	Jan. 69-Dec. 69	21st	183 385	165 772	(a)	17 378	12 173	876 178	847 580	416	391	8.3
		22nd	165 444	154 829		1 429	1 429	779 082	796 541	478	259	7.1

a) The date of the cycles of malathion are in agreement with the cycles of DDT, although the malathion cycles are of four months.



NICARAGUA (Cont.)

EPIDEMIOLOGICAL EVALUATION OPERATIONS, ATTACK PHASE AREAS

Year	Slides examined			Species found		
	Total No.	Positive				
		Number	Percentage	P. falciparum	P. vivax	P. malariae
1958	23 982	890	3.7	...	...	...
1959	38 966	1 875	4.8	619	1 256	-
1960	74 074	7 528	10.2	4 217	3 311	-
1961	109 293	8 722	8.0	3 001	5 721	-
1962	162 733	11 200	6.9	3 428	7 772	-
1963	152 339	10 593	6.9	2 742	7 851	-
1964	173 068	11 197	6.5	2 403	8 794	-
1965	167 589	8 670	5.2	883	7 787	-
1966	197 472	13 895	7.0	2 045	11 850	-
1967	269 575	16 321	6.1	2 353	13 968	-
1968	411 544	8 250	2.0	479	7 771	-
1969	498 119	16 043	3.2	2 673	13 370	-

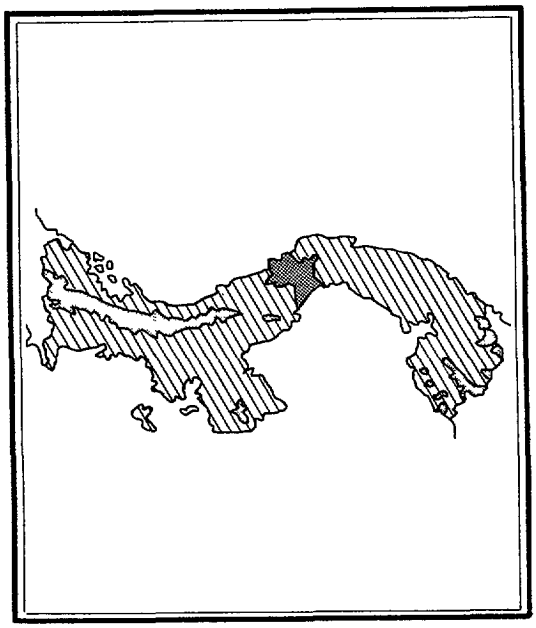
CONSOLIDATION PHASE AREAS

Year	Estimated population in the area (thousands)	No. of slides examined	% of population sampled (annual rate)	Total No. of positive cases	Origin of infections							Species of parasite		
					Autochthonous	Relapsing	Imported		Induced	Introduced	Not investigated and unclassified	P. falciparum	P. vivax	P. malariae
							from abroad	from areas within country						
1962[a]	515	18 994	7.4	159	57	13	-	50	-	1	38	26	132	1
1963	668	62 511	9.4	966	494	39	-	230	1	3	199	478	488	-
1964	695	74 543	10.7	1 819	654	140	-	364	1	1	659	506	1 313	-
1965	730	68 945	9.4	1 605	568	221	-	458	-	6	352	154	1 451	-
1966[b]	665	57 036	8.6	1 752	604	90	-	143	-	-	915	83	1 669	-

a) July-December.

PANAMA

STATUS OF MALARIA PROGRAM AT DECEMBER 1969



	Population (thousands)	Area km^2
TOTAL COUNTRY	1 417	75 650
Non malarious areas	57	5 810
Originally malarious areas		
Maintenance phase	-	-
Consolidation phase	-	-
Attack phase	1 360	69 840
Preparatory phase	-	-
Total originally malarious areas	1 360	69 840

PERSONNEL

Activity	Professional	Non professional	Total
Spraying operations	1	326	327
Evaluation operations	1	182	183
Administrative and other	5	72	77
Transport	-	16	16
Total	7	596	603

TRANSPORT FACILITIES

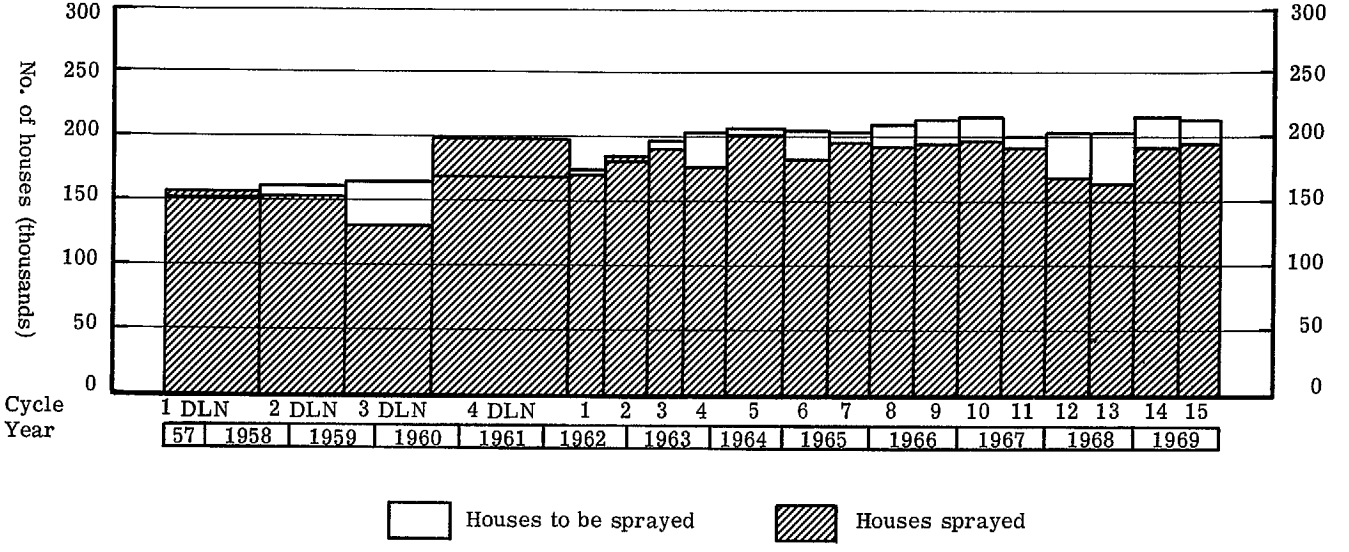
Type	Spraying Operations	Evaluation Operations	Mixed or other operations	Total
Four-wheel vehicles	84	5	12	101
Two-wheel vehicles	-	52	4	56
Boats	42	3	-	45
Animals	-	-	-	-
Other	-	-	-	-
Total	126	60	16	202

PANAMA (Cont.)

SPRAYING OPERATIONS

Year of total coverage	Date	Houses sprayed						Inhabitants directly protected		Insecticide used per house (g. technical)		Average houses sprayed per spray-man/day
		DDT			Dieldrin							
		Cycle	Planned	Sprayed	Cycle	Planned	Sprayed	Planned	Protected	DDT	Dieldrin	
1st	Aug. 57-Aug. 58	-	-	-	1st	152 957	155 963	659 856 a)	671 824 a)	-	119	6.5
2nd	Sep. 58-Aug. 59	-	-	-	2nd	161 700	154 638	697 574	667 095	-	145	6.9
3rd	Sep. 59-Aug. 60	-	-	-	3rd	165 102	131 270	707 462	562 514	-	129	7.3
4th	Sep. 60-Apr. 62	-	-	-	4th	172 121	199 265	722 392	836 229	-	138	6.8
5th	May 62-Apr. 63	1st	175 622	174 779	-	(b)	1 101 c)	710 918	711 983	490	63	8.1
		2nd	182 784	184 355			1 192 c)	714 320	726 944	510	103	8.8
6th	May 63-Apr. 64	3rd	197 379	193 960	-	(b)	1 024 c)	733 060	724 166	477	77	8.9
		4th	205 165	176 912			1 268 c)	771 827	670 310	455	71	9.3
7th	May 64-Jun. 65	5th	209 126	201 976	-	(b)	1 078 c)	750 420	728 633	440	77	9.0
		6th	206 495	183 650		1332	1 867 c)	724 990	647 164	421	77	9.0
8th	Jul. 65-Jun. 66	7th	205 050	196 902	-	1 105	1 133 c)	730 020	701 266	421	73	8.8
		8th	211 390	193 629		...	1 249	710 101	654 648	416	71	7.4
9th	Jul. 66-Jun. 67	9th	215 450	196 258	-	1 250	1 315	720 552	664 620	428	83	7.5
		10th	217 620	197 700		-	-	761 670	712 459	432	-	8.0
10th	Jul. 67-Jun. 68	11th	201 950	194 832	-	-	-	706 825	649 039	431	-	8.3
		12th	205 148	168 479				759 048	584 220	436		7.5
11th	Jul. 68-Jun. 69	13th	207 214	165 285	-	-	-	766 692	563 486	423	-	7.0
		14th	208 154	183 546				749 354	644 757	434		7.6
12th	Jul. 69-Dec. 69	15th	215 369	196 003	-	-	-	755 945	757 402	495	-	7.1

a) Estimated. b) Included in DDT column. c) Sprayed twice a year with 0.3 g/m^2.



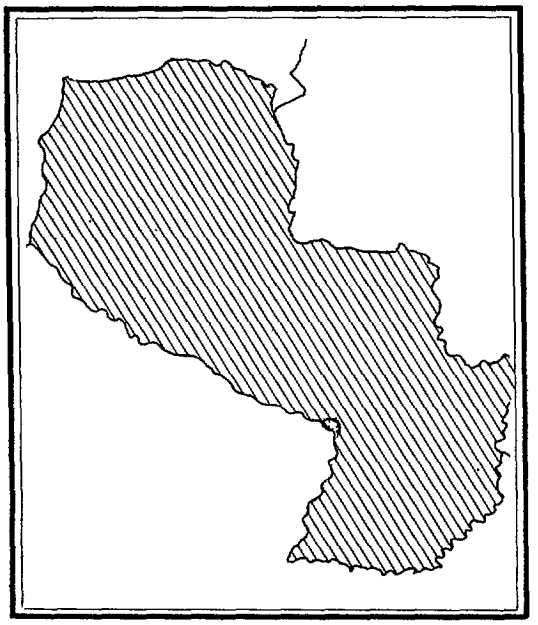
EPIDEMIOLOGICAL EVALUATION OPERATIONS, ATTACK PHASE AREAS

Year	Slides examined			Species found		
	Total No.	Positive		P. falciparum	P. vivax	P. malariae
		Number	Percentage			
1957[a]	18 181	1 162	6.4	545	...	...
1958	91 933	6 067	6.6	1 461	4 537	69
1959	78 661	5 017	6.4	620	4 395	2
1960	77 099	4 463	5.8	670	3 792	1
1961	88 961	3 911	4.4	1 378	2 531	2
1962	145 012	3 249	2.2	631	2 618	-
1963	152 898	2 670	1.7	236	2 433	1
1964	131 887	1 804	1.4	101	1 703	-
1965	102 969	1 929	1.9	172	1 757	-
1966	97 525	3 664	3.8	919	2 744	1
1967	88 614	2 697	3.0	527	2 170	-
1968	83 211	1 625	2.0	495	1 130	-
1969	94 596	5 938	6.3	4 106	1 832	-

a) August-December.

PARAGUAY

STATUS OF MALARIA PROGRAM AT DECEMBER 1969



	Population (thousands)	Area km^2
TOTAL COUNTRY	2 331	406 752
Non malarious areas	409	200
Originally malarious areas		
Maintenance phase	-	-
Consolidation phase	-	-
Attack phase	1 922	406 552
Preparatory phase	-	-
Total originally malarious areas	1 922	406 552

PERSONNEL

Activity	Professional	Non professional	Total
Spraying operations	2	470	472
Evaluation operations	5	81	86
Administrative and other	2	46	48
Transport	-	92	92
Total	9	689	698

TRANSPORT FACILITIES

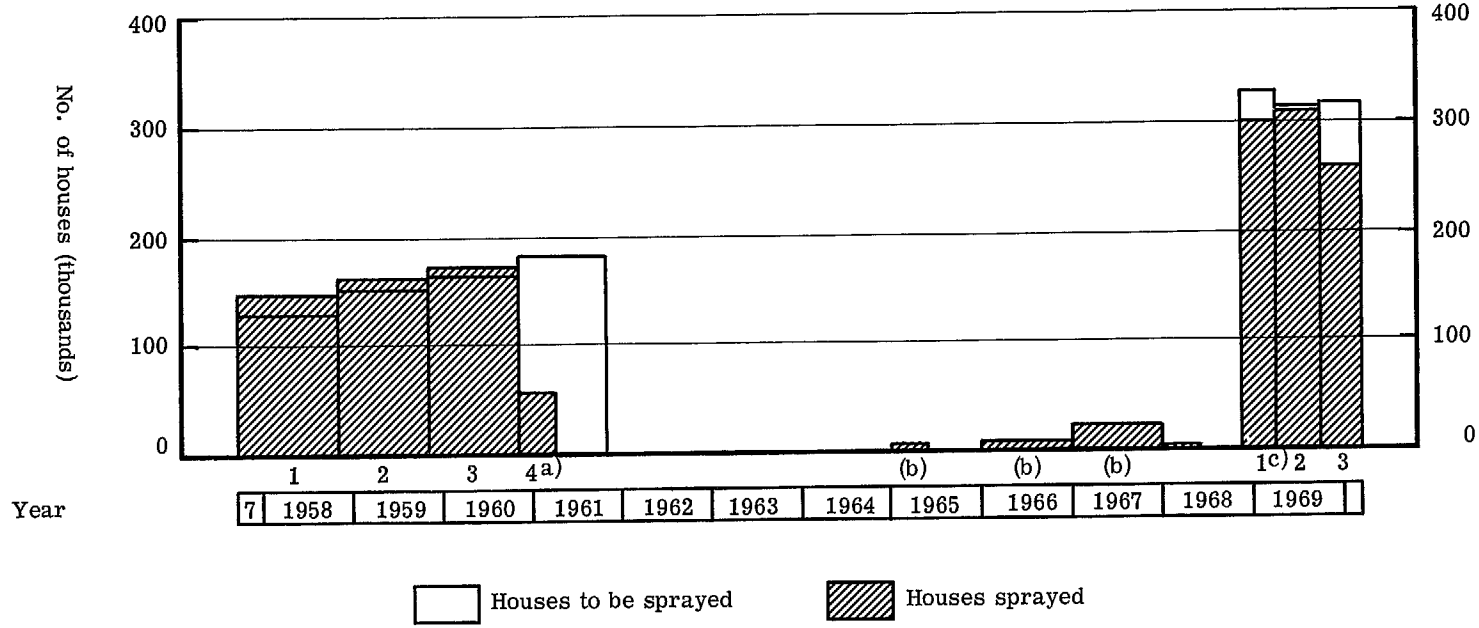
Type	Spraying Operations	Evaluation Operations	Mixed or other operations	Total
Four-wheel vehicles	94	4	27	125
Two-wheel vehicles	-	21	6	27
Boats	6	7	8	21
Animals	-	-	-	-
Other	-	-	-	-
Total	100	32	41	173

PARAGUAY (Cont.)

SPRAYING OPERATIONS

Year of total coverage	Date	Houses sprayed						Inhabitants directly protected		Insecticide used per house (g. technical)		Average houses sprayed per spray-man/day
		DDT			Dieldrin							
		Cycle	Planned	Sprayed	Cycle	Planned	Sprayed	Planned	Protected	DDT	Dieldrin	
1st	Nov. 57-Oct. 58	-	-	-	1st	126 902	148 626	638 190	747 541	-	105	10. 9
2nd	Nov. 58-Oct. 59	-	-	-	2nd	150 033	161 261	749 115	805 232	-	111	14. 3
3rd	Nov. 59-Oct. 60	-	-	-	3rd	163 586	171 086	807 460	844 515	-	118	11. 7
4th[a]	Nov. 60-Mar. 61	-	-	-	4th[a]	181 097	56 656	898 060	280 982	-	138	8. 1
(b)	Jan. 65-May. 65	-	-	-	-	-	5 709	-	27 213	-	129	6. 6
(b)	Jan. 66-Dec. 66	-	-	-	-	-	6 993	-	55 614	-	126	6. 9
(b)	Jan. 67-Dec. 67	-	-	12 359	-	-	1 519	...	70 227	534	134	6. 7
1st[c]	Oct. 68-Sep. 69	1st	330 000	304 100	-	-	-	1 500 000	1 384 606	472	-	8. 2
		2nd	314 102	311 000	-	-	-	1 430 000	1 461 027	448	-	9. 1
2nd	Oct. 69-Feb. 70	3rd[d]	317 805	260 388	-	-	-	1 397 988	1 163 210	475	-	9. 3

a) Program suspended, new program being planned. b) Emergency spraying. c) New coverage started in October 1968. d) Cycle not yet finished.



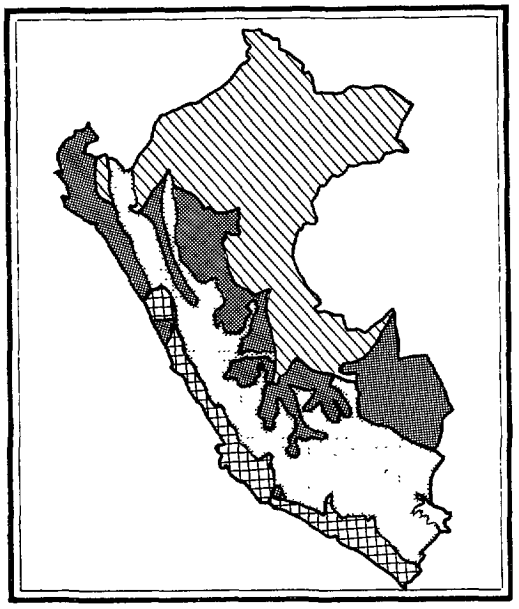
PARAGUAY (Cont.)

EPIDEMIOLOGICAL EVALUATION OPERATIONS, ATTACK PHASE AREAS

Year	Slides examined			Species found		
	Total No.	Positive		P. falciparum	P. vivax	P. malariae
		Number	Percentage			
1958	14 359	526	3.7	...	...	...
1959	11 379	641	5.6	1	640	-
1960	47 045	1 165	2.5	5	1 159	1
1961	27 995	1 528	5.5	9	1 519	-
1962	48 184	5 756	11.9	313	5 443	-
1963	92 806	3 443	3.7	313	3 130	-
1964	103 169	8 851	8.6	961	7 889	1
1965	82 848	6 732	8.1	115	6 616	1
1966	131 293	33 026	25.1	717	32 309	-
1967	164 444	50 304	30.6	6 636	43 668	-
1968	113 770	20 743	18.2	794	19 949	-
1969	129 509	10 307	8.0	1 591	8 716	-

PERU

STATUS OF MALARIA PROGRAM AT DECEMBER 1969



	Population (thousands)	Area km^2
TOTAL COUNTRY	13 172	1 285 216
Non malarious areas	8 582	324 044
Originally malarious areas		
Maintenance phase	1 133	84 497
Consolidation phase	2 256	327 685
Attack phase	1 201	548 990
Preparatory phase	-	-
Total originally malarious areas	4 590	961 172

PERSONNEL

Activity	Professional	Non professional	Total
Spraying operations	4	226	230
Evaluation operations	9	286	295
Administrative and other	10	69	79
Transport	1	85	86
Total	24	666	690

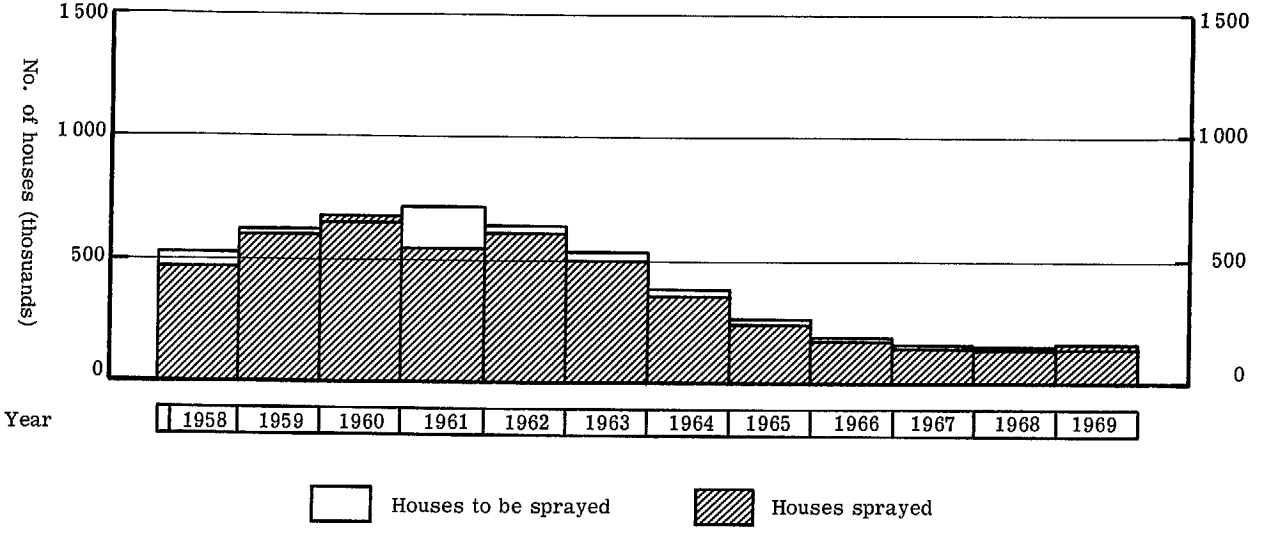
TRANSPORT FACILITIES

Type	Spraying Operations	Evaluation Operations	Mixed or other operations	Total
Four-wheel vehicles	30	61	43	134
Two-wheel vehicles	-	-	-	-
Boats	31	67	32	130
Animals	-	-	-	-
Other	-	-	-	-
Total	61	128	75	264

SPRAYING OPERATIONS

Year of total coverage	Date	Houses sprayed						Inhabitants directly protected		Insecticide used per house (g. technical)		Average houses sprayed per spray-man/day
		DDT			Dieldrin							
		Cycle	Planned	Sprayed	Cycle	Planned	Sprayed	Planned	Protected	DDT	Dieldrin	
1st	Nov. 57-Oct. 58	1st + 2nd	527 081	286 764a) 79 266b)	1st	(c)	122 120	2 054 035	1 867 208	426	115	7.8
2nd	Jan. 59-Dec. 59	(d)	637 241	271 065e)	2nd	(c)	341 804	2 886 064	2 775 694	424	118	8.4
3rd	Jan. 60-Dec. 60	(d)	654 825	447 848e)	3rd	(c)	234 643	3 209 952	3 345 726	468	95	8.4
4th	Jan. 61-Dec. 61	(d)	714 740	534 037e)	4th	(c)	25 005	2 826 797	2 210 988	410	109	7.9
5th	Jan. 62-Dec. 62	(d)	646 992	627 527e)	-	-	-	2 354 405	2 283 960	465	-	8.7
6th	Jan. 63-Dec. 63	(d)	537 112	500 218e)	-	-	-	1 885 800	1 756 286	459	-	8.
7th	Jan. 64-Dec. 64	(d)	357 805	379 184e)	-	-	-	1 182 617	1 253 290	473	-	7.9
8th	Jan. 65-Dec. 65	(d)	264 319	240 003e)	-	-	-	860 017	780 901	507	-	7.2
9th	Jan. 66-Dec. 66	(d)	190 613	186 109e)	-	-	-	610 379	595 958	523	-	6.6
10th	Jan. 67-Dec. 67	(d)	169 436	162 433e)	-	-	-	559 139	545 895	517	-	6.7
11th	Jan. 68-Dec. 68	(d)	150 780	153 893e)	-	-	-	507 634	546 434	584	-	5.9
12th	Jan. 69-Dec. 69	(d)	167 469	173 975	-	-	-	611 117	601 630	506	-	6.3

a) Sprayed once a year. b) Sprayed twice a year. c) Included in DDT column. d) Owing to different spray cycle in timing in different regions, these data refer to the calendar year. e) Sprayings.



PERU (Cont.)

EPIDEMIOLOGICAL EVALUATION OPERATIONS, ATTACK PHASE AREAS

Year	Slides examined			Species found		
	Total No.	Positive		P. falciparum	P. vivax	P. malariae
		Number	Percentage			
1958 a)	...	649 b)	...	77	526	27
1959	148 413	4 658 b)	3.1	302	4 265	51
1960	342 503	3 901	1.1	256	3 559	86
1961	403 748	3 055	0.8	185	2 804	66
1962	399 309	2 196	0.5	81	2 035	80
1963	313 649	1 630	0.5	101	1 389	140
1964	308 283	1 613	0.5	301	1 222	90
1965	280 449	1 508	0.5	113	1 315	80
1966	266 237	1 785	0.7	32	1 663	90
1967	198 340	2 689	1.4	105	2 512	72
1968	129 951	1 970	1.5	51	1 875	44
1969	143 052	2 850	2.0	22	2 791	37

CONSOLIDATION PHASE AREAS

Year	Estimated population in the area (thousands)	No. of slides examined	% of population sampled (annual rate)	Total No. of positive cases	Origin of infections							Species of parasite		
					Autochthonous	Relapsing	Imported		Induced	Introduced	Not investigated and unclassified	P. falciparum	P. vivax	P. malariae
							from abroad	from areas within country						
1959	14	1 378	9.8	-	-	-	-	-	-	-	-	-	-	-
1960	15	7 277	48.5	5	-	-	1	-	4	-	-	-	1	4
1961	47	13 780	29.3	1	-	-	-	1	-	-	-	-	-	-
1962	864	71 330	8.3	20	2	1	1	12	4	-	-	1	16	3
1963	2 199	168 727	7.7	87	13	6	5	51	3	-	9	-	83	4
1964	2 204	186 205	8.4	321	209	45	-	25	2	3	37	1	316	4
1965	2 334	165 388	7.1	367	209	50	1	6	1	-	100	13	349	5
1966	1 962	138 634	7.1	233	87	39	-	14	1	-	92	-	233	-
1967	1 992	112 753	5.7	80	58	1	1	6	-	4	10	-	78	2
1968	2 184	85 336	3.9	34	10	6	1	9	1	-	7	1	31	2
1969	2 256	94 647	4.2	309	180	9	2	93	-	-	25	-	308	1

a) November 1957-October 1958. b) Includes undifferentiated mixed infections.

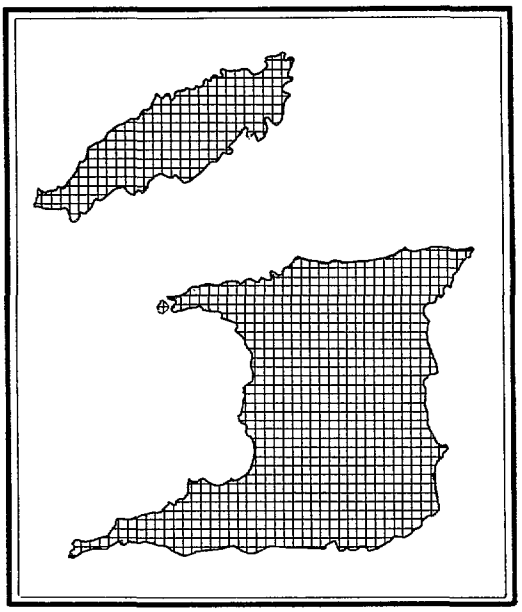
PERU (Cont.)

MAINTENANCE PHASE AREAS

Year	Estimated population in the area (thousands)	No. of slides examined	% of population sampled (annual rate)	Total No. of positive cases	Origin of infections							Species of parasite		
					Autochthonous	Relapsing	Imported		Induced	Introduced	Not investigated and unclassified	P. falciparum	P. vivax	P. malariae
							from abroad	from areas within country						
1963	43	8 581	20.0	4	-	-	1	1	2	-	-	-	2	2
1964	43	8 256	19.2	-	-	-	-	-	-	-	-	-	-	-
1965	46	6 260	13.6	2	-	-	-	-	2	-	-	-	-	2
1966	1 044	20 032	1.9	7	-	-	1	3	1	-	2	-	5	2
1967	1 058	30 738	2.9	3	-	-	-	2	1	-	-	-	1	2
1968	1 112	31 829	2.9	6	-	-	-	1	2	-	3	-	5	1
1969	1 133	25 645	2.3	9	2	-	4	-	1	-	2	-	7	2

TRINIDAD AND TOBAGO

STATUS OF MALARIA PROGRAM AT DECEMBER 1969



	Population (thousands)	Area km^2
TOTAL COUNTRY	1 125	5 605
Non malarious areas	155	161
Originally malarious areas		
Maintenance phase	970	5 444
Consolidation phase	-	-
Attack phase	-	-
Preparatory phase	-	-
Total originally malarious areas	970	5 444

PERSONNEL

Activity	Professional	Non professional	Total
Spraying operations	1	91	92
Evaluation operations	11	110	121
Administrative and other	2	48	50
Transport	-	10	10
Total	14	259	273

TRANSPORT FACILITIES

Type	Spraying Operations	Evaluation Operations	Mixed or other operations	Total
Four-wheel vehicles	2	8	-	10
Two-wheel vehicles	-	-	-	-
Boats	-	-	-	-
Animals	-	-	-	-
Other	-	-	-	-
Total	2	8	-	10

TRINIDAD AND TOBAGO (Cont.)

EPIDEMIOLOGICAL EVALUATION OPERATIONS, ATTACK PHASE AREAS

Year	Slides examined			Species found		
	Total No.	Positive		P. falciparum	P. vivax	P. malariae
		Number	Percentage			
1958	51 159	374	0.7	316	58	-
1959	101 039	92	0.1	63	28	1
1960	91 388	11	0.01	9	2	-
1961	89 569	0	-	-	-	-

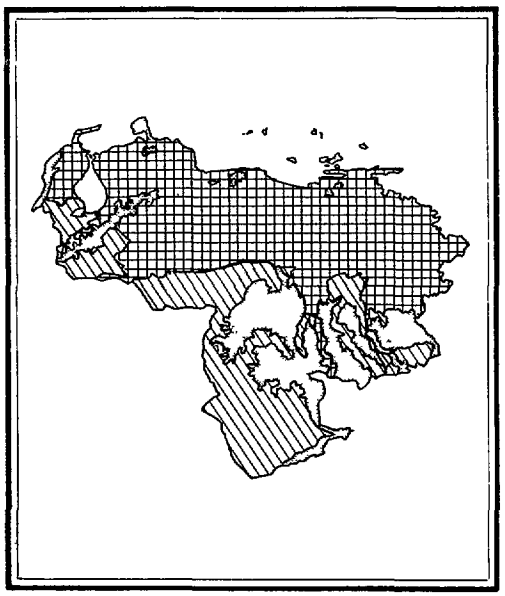
CONSOLIDATION PHASE AREAS

Year	Estimated population in the area (thousands)	No. of slides examined	% of population sampled (annual rate)	Total No. of positive cases	Origin of infections							Species of parasite		
					Autochthonous	Relapsing	Imported		Induced	Introduced	Not investigated and unclassified	P. falciparum	P. vivax	P. malariae
							from abroad	from areas within country						
1958	160	21 279	13.2	2	-	-	2	-	-	-	-	2	-	-
1959	160	361	0.2	5	-	-	5	-	-	-	-	4	1	-
1960	185	17 612	9.5	2	-	-	2	-	-	-	-	1	1	-
1961	197	11 602	5.9	1	-	-	1	-	-	-	-	1	-	-
1962	877	120 967	13.8	1	-	-	1	-	-	-	-	-	1	-
1963	828	108 388	13.1	0	-	-	-	-	-	-	-	-	-	-
1964	822	82 038	10.0	3	-	1	2	-	-	-	-	-	1	2
MAINTENANCE PHASE AREAS														
1965[a]	846	58 922	7.6	2	-	-	2	-	-	-	-	2	-	-
1966	872	89 156	10.2	40	38	1	1	-	-	-	-	1	-	39
1967	872	74 255	8.5	0	-	-	-	-	-	-	-	-	-	-
1968	885	65 757	7.4	5	-	1	4	-	-	-	-	4	-	1
1969	970	42 272	4.4	5	-	-	5[b]	-	-	-	-	3	-	2

a) January-November. b) One imported relapsing case.

VENEZUELA

STATUS OF MALARIA PROGRAM AT DECEMBER 1969



	Population (thousands)	Area km^2
TOTAL COUNTRY	9 550	912 050
Non malarious areas	2 440	312 050
Originally malarious areas		
Maintenance phase	6 711	461 259
Consolidation phase	-	-
Attack phase	399	138 741
Preparatory phase	-	-
Total originally malarious areas	7 110	600 000

PERSONNEL

Activity	Professional	Non professional	Total
Spraying operations	2	519	521
Evaluation operations	24	465	489
Administrative and other	(a)	(a)	(a)
Transport	(a)	(a)	(a)
Total	26	984	1 010

TRANSPORT FACILITIES

Type	Spraying Operations	Evaluation Operations	Mixed or other operations	Total
Four-wheel vehicles	127	144	-	271
Two-wheel vehicles	36	315	-	351
Boats	36	88	-	124
Animals	300	335	-	635
Other	36[b]	-	-	36
Total	535	882	-	1 417

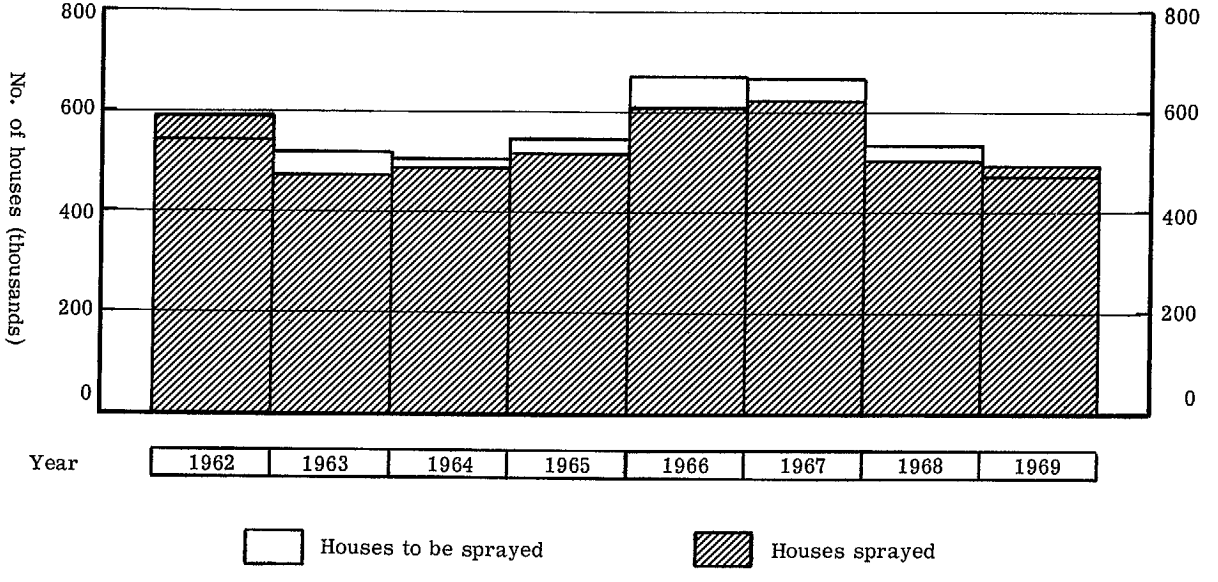
a) Services performed by personnel of the "Dirección de Malariología y Saneamiento Ambiental" in charge of different programs of environmental sanitation.
b) Fogging machines.

VENEZUELA (Cont.)

SPRAYING OPERATIONS

Year of total coverage	Date	Houses sprayed						Inhabitants directly protected		Insecticide used per house (g. technical)		Average houses sprayed per spray-man/day
		DDT			Dieldrin							
		Cycle	Planned	Sprayed	Cycle	Planned	Sprayed	Planned	Protected	DDT	Dieldrin	
...	Jan. 62-Dec. 62	...	595 757	510 287[a]	...	(b)	29 782	2 305 330	2 024 180	365	218	6.6
...	Jan. 63-Dec. 63	...	526 626	475 753[a]	...	(b)	4 112	2 155 390	1 964 197	368	274	7.0
...	Jan. 64-Dec. 64	...	505 250	490 884[a][c]	...	(b)	(b)	2 069 353[d]	2 010 565	384	...	7.3
...	Jan. 65-Dec. 65	...	553 218[d]	522 616[a][c]	-	-	-	2 279 763[d]	2 153 429	422	-	7.0
...	Jan. 66-Dec. 66	...	676 336	611 665[a][c]	-	-	-	2 825 556	2 554 844	399	-	6.7
...	Jan. 67-Dec. 67	...	675 556	623 926[a]	-	-	-	2 837 335	2 578 451	373	-	7.2
...	Jan. 68-Dec. 68	...	543 874	505 452[a]	-	-	-	...	2 039 352	465	-	6.3
...	Jan. 69-Dec. 69	...	477 090	492 476[a]	-	-	-	1 744 475	1 996 617	479	-	6.8

a) Including houses sprayed twice, three and four times a year. b) Included in DDT column. c) Including houses sprayed with BHC or lindane.
d) Estimated.



EPIDEMIOLOGICAL EVALUATION OPERATIONS, ATTACK PHASE AREAS

Year	Slides examined			Species found		
	Total No.	Positive		P. falciparum	P. vivax	P. malariae
		Number	Percentage			
1958	269 448	975[a]	0.4	60	901	4
1959	232 710	765[a]	0.3	92	646	14
1960	247 429	1 346[a]	0.5	165	1 163	6
1961	230 336	1 175[a]	0.5	68	1 075	21
1962	172 280	883[b]	0.5	53	812	14
1963	153 406	2 194[b]	1.4	80	2 083	20
1964	141 977	3 948[b]	2.8	451	3 486	4
1965[c]	267 227	3 448	1.3	152	3 294	2
1966[c]	294 602	3 935	1.3	465	3 431	39
1967	249 057	4 281	1.7	940	3 323	18
1968[d]	201 568	5 555	2.8	1 511	3 989	55
1969	156 347	7 933	5.1	1 821	6 046	66

CONSOLIDATION PHASE AREAS

Year	Estimated population in the area (thousands)	No. of slides examined	% of population sampled (annual rate)	Total No. of positive cases	Origin of infections							Species of parasite		
					Autochthonous	Relapsing	Imported		Induced	Introduced	Not investigated and unclassified	P. falciparum	P. vivax	P. malariae
							from abroad	from areas within country						
1958	469	69 614	14.8	50	-	-	27		-	23	-	2	46	2
1959	685	101 878	14.9	45	-	-	37		1	7	-	2	43	-
1960	291	93 047	32.0	112[a]	-	2	31	45	1	33	-	-	108	2
1961	174	64 923	37.3	57	-	4	15	9	-	29	-	-	57	-
1962	150	93 646	62.4	74[a]	-	1	29	7	-	37	-	22	51	-
1963	102	61 724	60.5	89[a]	-	-	32	7	-	50	-	26	62	-
1964	99	58 605	59.2	74	-	-	15	9	-	50	-	-	74	-
1965	132	41 227	41.6	20	-	-	11	3	-	6	-	10	10	-
1966	67	31 766	63.2	33	-	-	14	9	-	10	-	6	27	-
1967	37	27 772	75.1	34	-	-	16	2	-	16	-	3	31	-

a) Includes undifferentiated mixed infections. b) Includes undifferentiated mixed infections and unclassified species of parasites.
c) Data for last quarter, not separated by phases. d) In 1968 areas in consolidation were reclassified to attack phase.

VENEZUELA (Cont.)

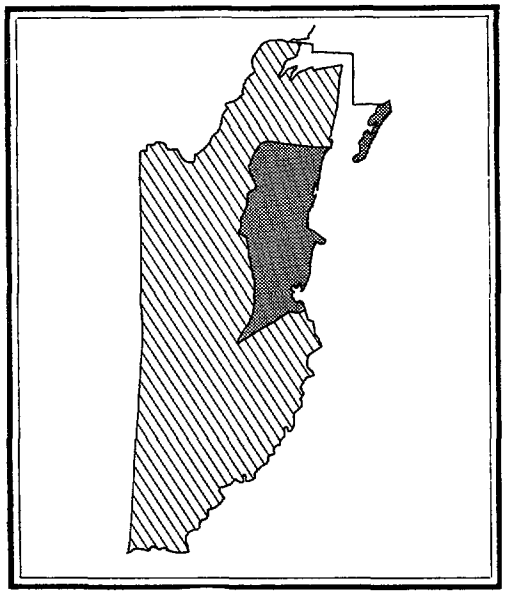
MAINTENANCE AND NON-MALARIOUS AREAS

Year	Estimated population in the area (thousands)	No. of slides examined	% of population sampled (annual rate)	Total No. of positive cases	Origin of infections							Species of parasite		
					Autochthonous	Relapsing	Imported		Induced	Introduced	Not investigated and unclassified	P. falciparum	P. vivax	P. malariae
							from abroad	from areas within country						
1958	4 720	145 654	3.1	113[a]	-	-	79		5	28	1	6	100	6
1959	5 097	169 189	3.3	101[a]	-	-	87		6	7	1	14	73	9
1960	6 092	224 193	3.7	216[a]	-	6	44	92	4	70	-	14	197	4
1961	7 111	305 252	4.3	522[a]	-	11	52	122	4	333	-	13	498	5
1962	7 410	282 314	3.8	253[a]	-	5	52	84	2	110	-	5	244	3
1963	7 701	284 814	3.7	570	-	-	79	286	3	202	-	6	562	2
1964	7 973	317 731	4.0	1 862[a]	(b)	1[b]	180[b]	1 076[b]	1[b]	339[b]	-	12	1 846	2
1965	8 205	236 588	3.8	1 875	-	-	81	805	5	984	-	70	1 780	25
1966	8 500	274 727	4.3	1 502[c]	-	-	110	802	1	588	-	42	1 454	6
1967	8 772	373 853	4.3	942	-	1	79	611	3	248	-	77	861	4
1968	6 545[b]	325 885[b]	5.0	180[b]	16[b]	-	42[b]	87[b]	2[b]	32[b]	1[b]	20[b]	155[b]	5[b]
1969	6 711[b]	311 811[b]	4.6	727[b]	104[b]	12[b]	151[b]	341[b]	3[b]	114[b]	2[d]	77[b]	647[b]	3[b]

a) Includes undifferentiated mixed infections. b) Maintenance phase only. c) Including one cryptic case. d) Cryptic cases.

BRITISH HONDURAS

STATUS OF MALARIA PROGRAM AT DECEMBER 1969



	Population (thousands)	Area km^2
TOTAL COUNTRY	122	22 965
Non malarious areas	-	-
Originally malarious areas		
Maintenance phase	-	-
Consolidation phase	49	4 307
Attack phase	73	18 658
Preparatory phase	-	-
Total originally malarious areas	122	22 965

PERSONNEL

Activity	Professional	Non professional	Total
Spraying operations	-	19 (5)	19 (5)
Evaluation operations	(1)	11	11 (1)
Administrative and other	-	4	4
Transport	-	2	2
Total	(1)	36 (5)	36 (6)

TRANSPORT FACILITIES

Type	Spraying Operations	Evaluation Operations	Mixed or other operations	Total
Four-wheel vehicles	4	5	5	14
Two-wheel vehicles	-	-	2	2
Boats	-	5	4	9
Animals	-	-	-	-
Other	-	-	-	-
Total	4	10	11	25

(Part-time personnel in parentheses)

BRITISH HONDURAS (Cont.)

SPRAYING OPERATIONS

Year of total coverage	Date	Cycle DDT	Houses sprayed		Inhabitants directly protected		Insecticide used per house (g. technical) DDT	Average houses sprayed per spray-man/day
			Planned	Sprayed	Planned	Protected		
(a)	Jun. 66-Dec. 66	...	...	6 447	...	30 889	426	10.0
...	Ene. 67-Dec. 67	1st-2nd	...	15 820	...	48 213	399	7.6
...	Ene. 68-Jun. 68	3rd	10 720	10 297	70 450	45 167	463	7.5
	Ago. 68-Dec. 68	4th	10 720	5 375	70 450	24 802	489	6.8
...	Ene. 69-Dec. 69	5th	10 127	9 060	72 316	41 541	508	7.1
		6th	11 127	10 533	72 316	47 081	506	7.8

a) New coverage started.

EPIDEMIOLOGICAL EVALUATION OPERATIONS, ATTACK PHASE AREAS

Year	Slides examined			Species found		
	Total No.	Positive		P. falciparum	P. vivax	P. malariae
		Number	Percentage			
1957	1 950	234	12.0	137	52	45
1958	4 374	288	6.6	117	147	24
1959	11 307	1 019	9.0	712	211	96
1960	13 307	196	1.5	55	138	3
1961	12 355	23	0.2	1	22	-
1962	7 895	2	0.03	-	2	-
1967[a]	12 959	358	2.8	160	198	-
1968	10 690	39	0.4	1	38	-
1969	10 725	27	0.3	-	27	-

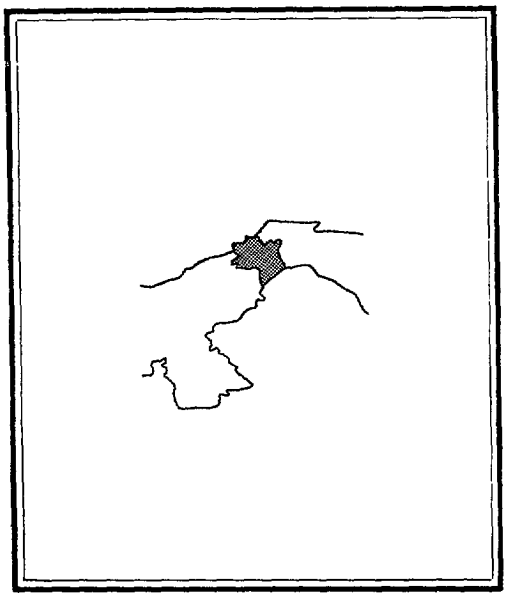
CONSOLIDATION PHASE AREAS

Year	Estimated population in the area (thousands)	No. of slides examined	% of population sampled (annual rate)	Total No. of positive cases	Origin of infections							Species of parasite		
					Autochthonous	Relapsing	Imported		Induced	Introduced	Not investigated and unclassified	P. falciparum	P. vivax	P. malariae
							from abroad	from areas within country						
1962[b]	100	6 661	16.0	18	10	7	1	-	-	-	-	-	18	-
1963	100	13 085	13.1	17	17	-	-	-	-	-	-	-	17	-
1964	104	11 826	11.4	35	32	2	1	-	-	-	-	-	35	-
1965	105	10 787	10.3	206	200	-	4	-	-	-	2	188	18	-
1966	107	13 920	13.0	552	551	-	1	-	-	-	-	260	292	-
1967	46	1 814	3.9	17	8	-	2	6	-	-	1[c]	10	7	-
1968	48	1 581	3.3	-	-	-	-	-	-	-	-	-	-	-
1969	49	1 469	3.0	1	-	-	-	1	-	-	-	-	1	-

a) At the beginning of 1967 all areas were brought back to attack phase, with the exception of Belize District. b) August-December.
c) Cryptic case.

CANAL ZONE

STATUS OF MALARIA PROGRAM AT DECEMBER 1969



	Population (thousands)	Area km^2
TOTAL COUNTRY	50	1 432
Non malarious areas	-	-
Originally malarious areas		
Maintenance phase	-	-
Consolidation phase	50	1 432
Attack phase	-	-
Preparatory phase	-	-
Total originally malarious areas	50	1 432

PERSONNEL

Activity	Professional	Non professional	Total
Spraying operations	-	-	-
Evaluation operations	-	-	-
Administrative and other	-	(36)	(36)
Transport	-	-	-
Total	-	(36)	(36)

TRANSPORT FACILITIES

Type	Spraying Operations	Evaluation Operations	Mixed or other operations	Total
Four-wheel vehicles	-	-	(2)	(2)
Two-wheel vehicles	-	-	-	-
Boats	-	-	(4)	(4)
Animals	-	-	-	-
Other	-	-	-	-
Total	-	-	(6)	(6)

(Figures in parentheses are to be considered as part-time)

CANAL ZONE (Cont.)

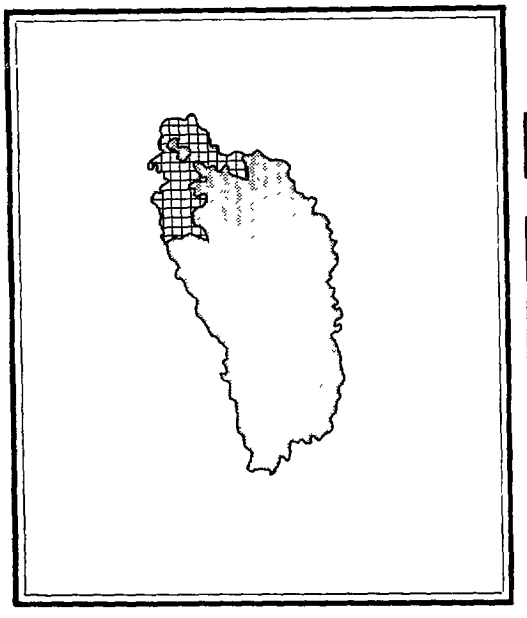
EPIDEMIOLOGICAL EVALUATION OPERATIONS, CONSOLIDATION PHASE AREAS

Year	Estimated population in the area (thousands)	No. of slides examined	% of population sampled (annual rate)	Total No. of positive cases	Origin of infections							Species of parasite		
					Autochthonous	Relapsing	Imported		Induced	Introduced	Not investigated and unclassified	P. falciparum	P. vivax	P. malariae
							from abroad	from areas within country						
1960	41	2 656	6.5	27	27	-	-	-	-	-	-	3	24	-
1961	41	5 984	14.6	25	25	-	-	-	-	-	-	2	23	-
1962	44	677	1.5	18	18	-	-	-	-	-	-	-	18	-
1963	47	21 008	44.7	22	-	1	16	-	-	-	5	2	20	-
1964	50	26 228	52.5	21	7	3	1	10	-	-	-	-	21	-
1965	50	24 024	48.0	38	1	7	29	-	-	1	-	6	32	-
1966[a]	50	23 434	51.1	71	26	4	41	-	-	-	-	1	70	-
1967	50	29 762	60.0	111	87	8	16	-	-	-	-	7	104	-
1968	50	22 367	44.7	89	70	8	10	-	-	-	-	5	84	-
1969	50	31 876	63.8	158	45	12	101	-	-	-	-	43	115	-

a) January-November.

DOMINICA

STATUS OF MALARIA PROGRAM AT DECEMBER 1969



	Population (thousands)	Area km^2
TOTAL COUNTRY	70	751
Non malarious areas	52	599
Originally malarious areas		
Maintenance phase	18	152
Consolidation phase	-	-
Attack phase	-	-
Preparatory phase	-	-
Total originally malarious areas	18	152

PERSONNEL

Activity	Professional	Non professional	Total
Spraying operations	-	-	-
Evaluation operations	(1)	9	9(1)
Administrative and other	-	(1)	(1)
Transport	-	-	-
Total	(1)	9(1)	9(2)

TRANSPORT FACILITIES

Type	Spraying Operations	Evaluation Operations	Mixed or other operations	Total
Four-wheel vehicles	-	1	-	1
Two-wheel vehicles	-	-	-	-
Boats	-	-	-	-
Animals	-	-	-	-
Other	-	-	-	-
Total	-	1	-	1

(Part-time personnel in parentheses)

DOMINICA (Cont.)

EPIDEMIOLOGICAL EVALUATION OPERATIONS, ATTACK PHASE AREAS

Year	Slides examined			Species found		
	Total No.	Positive		P. falciparum	P. vivax	P. malariae
		Number	Percentage			
1959[a]	2 801	46	1.6	46	-	-
1960	6 151	6	0.1	6	-	-
1961	10 113	3	0.0	1	-	2
1962	13 373	0	-	-	-	-

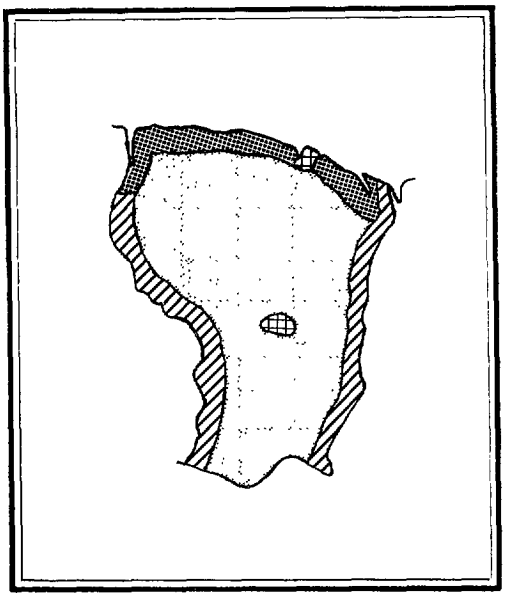
CONSOLIDATION PHASE AREAS

Year	Estimated population in the area (thousands)	No. of slides examined	% of population sampled (annual rate)	Total No. of positive cases	Origin of infections							Species of parasite		
					Autochthonous	Relapsing	Imported		Induced	Introduced	Not investigated and unclassified	P. falciparum	P. vivax	P. malariae
							from abroad	from areas within country						
1963	14	16 775	119.8	-	-	-	-	-	-	-	-	-	-	-
1964	14	16 154	115.4	-	-	-	-	-	-	-	-	-	-	-
1965	15	9 894	66.0	-	-	-	-	-	-	-	-	-	-	-
MAINTENANCE PHASE AREAS														
1966	17	6 634	39.0	-	-	-	-	-	-	-	-	-	-	-
1967	18	3 571[b]	19.8	-	-	-	-	-	-	-	-	-	-	-
1968	18	5 197	28.9	-	-	-	-	-	-	-	-	-	-	-
1969	18	2 779	15.4	-	-	-	-	-	-	-	-	-	-	-

a) June-December. b) Does not include information for July, August and September.

FRENCH GUIANA

STATUS OF MALARIA PROGRAM AT DECEMBER 1969



	Population (thousands)	Area km^2
TOTAL COUNTRY	44	90 000
Non malarious areas	-	69 300
Originally malarious areas		
Maintenance phase	25	200
Consolidation phase	15	7 500
Attack phase	4	13 000
Preparatory phase	-	-
Total originally malarious areas	44	20 700

PERSONNEL

Activity	Professional	Non professional	Total
Spraying operations	-	77	77
Evaluation operations	2	5	7
Administrative and other	-	3	3
Transport	-	19	19
Total	2	104	106

TRANSPORT FACILITIES

Type	Spraying Operations	Evaluation Operations	Mixed or other operations	Total
Four-wheel vehicles	-	-	10	10
Two-wheel vehicles	-	-	-	-
Boats	-	3	6	9
Animals	-	-	-	-
Other	-	-	-	-
Total	-	3	16	19

FRENCH GUIANA (Cont.)

SPRAYING OPERATIONS

Year of total coverage	Date	Houses sprayed						Inhabitants directly protected		Insecticide used per house (g. technical)		Average houses sprayed per spray-man/day
		DDT			Dieldrin							
		Cycle	Planned	Sprayed	Cycle	Planned	Sprayed	Planned	Protected	DDT	Dieldrin	
...	Jan. 64-Dec. 64	...	2 137	1 972	...	8 912	2 326[a]	37 915	14 762	330	...	...
...	Jan. 65-Dec. 65	...	2 127	1 246	...	8 912	7 318[a]	...	...	253	...	...
...	Jan. 66-Dec. 66	...	2 117	2 500	...	8 912	6 932[a]	44 433	38 000	...	...	...
...	Feb. 67-Dec. 67	...	3 886	845	...	10 574	8 081[a]	...	...	...	...	...
...	Feb. 68-Dec. 68	...	3 000	2 977	...	11 000	10 487[b]	46 400	...	...	...	...
...	Feb. 69-Dec. 69	...	(c)	(c)	...	28 105[c]	26 861[c]	43 500[c]	43 500[c]	...	...	...

a) Includes houses sprayed with DDT once a year, malathion and actidrine. b) Sprayed with malathion once a year. c) Includes houses sprayed with DDT, malathion and dieldrin.

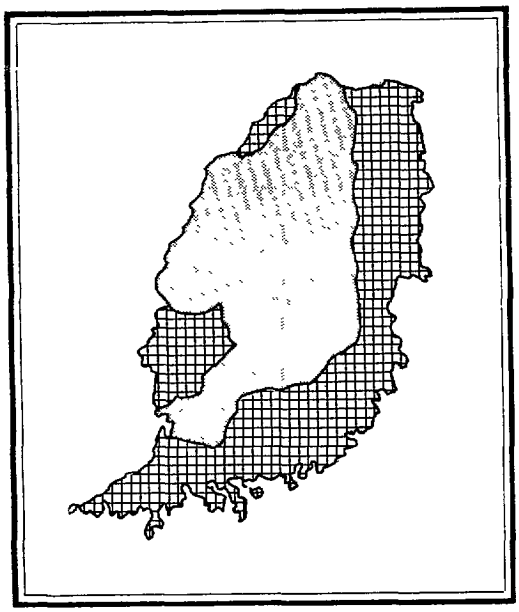
FRENCH GUIANA (Cont.)

EPIDEMIOLOGICAL EVALUATION OPERATIONS

Year	Slides examined			Species found		
	Total No.	Positive		P. falciparum	P. vivax	P. malariae
		Number	Percentage			
1960	3 343	37	1.1	30	6	1
1961	1 197	33	2.8	33	-	-
1962	2 183	70	3.2	60	10	-
1963	2 648	70	2.6	61	9	-
1964	3 025	48	1.6	16	32	-
1965	5 424	22	0.4	15	7	-
1966	6 180	12	0.2	8	4	-
1967	9 811	25	0.3	19	6	-
1968	7 132	50	0.7	35	14	1
1969	7 000	52	0.7	20	32	-

GRENADA AND CARRIACOU

STATUS OF MALARIA PROGRAM AT DECEMBER 1969



(Island of Carriacou in Maintenance phase, not shown in the Map)

	Population (thousands)	Area km^2
TOTAL COUNTRY	106	342
Non malarious areas	70	239
Originally malarious areas		
Maintenance phase	36	103
Consolidation phase	-	-
Attack phase	-	-
Preparatory phase	-	-
Total originally malarious areas	36	103

PERSONNEL

Activity	Professional	Non professional	Total
Spraying operations	-	-	-
Evaluation operations	-	-	-
Administrative and other	-	-	-
Transport	-	-	-
Total	-	-	-

TRANSPORT FACILITIES

Type	Spraying Operations	Evaluation Operations	Mixed or other operations	Total
Four-wheel vehicles	-	-	-	-
Two-wheel vehicles	-	-	-	-
Boats	-	-	-	-
Animals	-	-	-	-
Other	-	-	-	-
Total	-	-	-	-

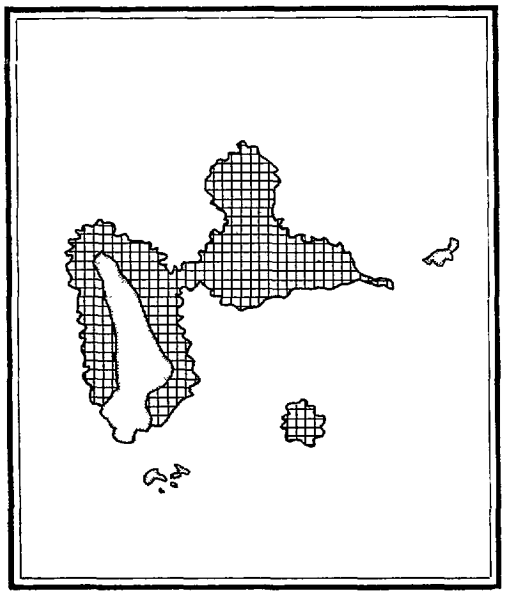
EPIDEMIOLOGICAL EVALUATION OPERATIONS, MAINTENANCE PHASE AREAS

Year	Estimated population in the area (thousands)	No. of slides examined	% of population sampled (annual rate)	Total No. of positive cases	Origin of infections							Species of parasite		
					Autochthonous	Relapsing	Imported		Induced	Introduced	Not investigated and unclassified	P. falciparum	P. vivax	P. malariae
							from abroad	from areas within country						
1962	37	1 996	5.4	-	-	-	-	-	-	-	-	-	-	-
1963	37	56	0.2	-	-	-	-	-	-	-	-	-	-	-
1964	39	517	1.3	-	-	-	-	-	-	-	-	-	-	-
1965	32	1 085	3.4	-	-	-	-	-	-	-	-	-	-	-
1966	32	1 263	3.9	-	-	-	-	-	-	-	-	-	-	-
1967	34	1 200	3.5	-	-	-	-	-	-	-	-	-	-	-
1968	34	218	0.6	-	-	-	-	-	-	-	-	-	-	-
1969	36	980[a]	5.4	-	-	-	-	-	-	-	-	-	-	-

a) January-June.

GUADELOUPE

STATUS OF MALARIA PROGRAM AT DECEMBER 1969



	Population (thousands)	Area km^2
TOTAL COUNTRY	335	1779
Non malarious areas	42	643
Originally malarious areas		
Maintenance phase	293	1136
Consolidation phase	-	-
Attack phase	-	-
Preparatory phase	-	-
Total originally malarious areas	293	1136

PERSONNEL

Activity	Professional	Non professional	Total
Spraying operations	-	-	-
Evaluation operations	1(1)	6(3)	7(4)
Administrative and other	-	-	-
Transport	-	-	-
Total	1(1)	6(3)	7(4)

TRANSPORT FACILITIES

Type	Spraying Operations	Evaluation Operations	Mixed or other operations	Total
Four-wheel vehicles	-	2(1)	-	2(1)
Two-wheel vehicles	-	-	-	-
Boats	-	-	-	-
Animals	-	-	-	-
Other	-	-	-	-
Total	-	2(1)	-	2(1)

(Figures in parentheses are to be considered as part-time)

GUADELOUPE (Cont.).

EPIDEMIOLOGICAL EVALUATION OPERATIONS, ATTACK PHASE AREAS

Year	Slides examined			Species found		
	Total No.	Positive		P. falciparum	P. vivax	P. malariae
		Number	Percentage			
1958	1 150	3	0.26	-	-	3
1959	3 903	-	0	-	-	-
1960 a)	4 450	2	0.04	...	...	...

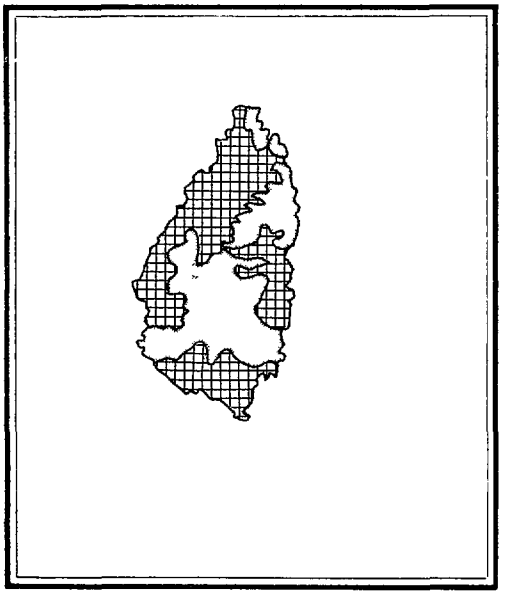
CONSOLIDATION PHASE AREAS

Year	Estimated population in the area (thousands)	No. of slides examined	% of population sampled (annual rate)	Total No. of positive cases	Origin of infections							Species of parasite		
					Autochthonous	Relapsing	Imported		Induced	Introduced	Not investigated and unclassified	P. falciparum	P. vivax	P. malariae
							from abroad	from areas within country						
1958	129	4 887	3.8	-	-	-	-	-	-	-	-	-	-	-
1959	133	3 691	4.8	-	-	-	-	-	-	-	-	-	-	-
1960	145	7 080	4.9	-	-	-	-	-	-	-	-	-	-	-
1961	186	11 857	6.4	-	-	-	-	-	-	-	-	-	-	-
1962	66	11 196	17.0	-	-	-	-	-	-	-	-	-	-	-
MAINTENANCE PHASE AREAS														
1961	58	2 407	4.1	-	-	-	-	-	-	-	-	-	-	-
1962	187	5 239	2.8	-	-	-	-	-	-	-	-	-	-	-
1963	260	17 170	8.8	1	-	-	1	-	-	-	-	-	-	-
1964	298 b)	21 831 c)	7.3	-	-	-	-	-	-	-	-	-	-	-
1965	300 b)	33 512 c)	11.2	-	-	-	-	-	-	-	-	-	-	-
1966	312 b)	32 022 c)	10.3	-	-	-	-	-	-	-	-	-	-	-
1967	287	17 882 c)	6.2	-	-	-	-	-	-	-	-	-	-	-
1968	289	14 018 c)	4.9	-	-	-	-	-	-	-	-	-	-	-
1969	335 b)	17 412 c)	5.2	-	-	-	-	-	-	-	-	-	-	-

a) January-September. b) Includes population of areas originally non-malarious. c) Includes slides taken in non-malarious areas.

ST. LUCIA

STATUS OF MALARIA PROGRAM AT DECEMBER 1969



	Population (thousands)	Area km^2
TOTAL COUNTRY	112	603
Non malarious areas	16	93
Originally malarious areas		
Maintenance phase	96	510
Consolidation phase	-	-
Attack phase	-	-
Preparatory phase	-	-
Total originally malarious areas	96	510

PERSONNEL

Activity	Professional	Non professional	Total
Spraying operations	-	-	-
Evaluation operations	-	3 (1)	3 (1)
Administrative and other	-	-	-
Transport	-	1	1
Total	-	4 (1)	4 (1)

TRANSPORT FACILITIES

Type	Spraying Operations	Evaluation Operations	Mixed or other operations	Total
Four-wheel vehicles	-	1	-	1
Two-wheel vehicles	-	1	-	1
Boats	-	-	-	-
Animals	-	-	-	-
Other	-	-	-	-
Total	-	2	-	2

(Part-time personnel in parentheses)

ST. LUCIA (Cont.)

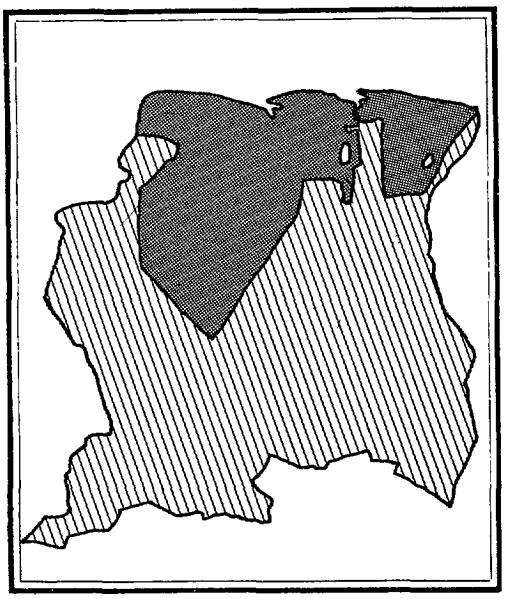
EPIDEMIOLOGICAL EVALUATION OPERATIONS, MAINTENANCE PHASE AREAS

Year	Estimated population in the area (thousands)	No. of slides examined	% of population sampled (annual rate)	Total No. of positive cases	Origin of infections							Species of parasite		
					Autochthonous	Relapsing	Imported		Induced	Introduced	Not investigated and unclassified	P. falciparum	P. vivax	P. malariae
							from abroad	from areas within country						
1962	82	5 059	24.7	-	-	-	-	-	-	-	-	-	-	-
1963	82	15 136	18.5	7	2	2	-	-	-	-	3[a]	-	-	7
1964	84	13 368	15.9	4	-	4	-	-	-	-	-	-	-	4
1965	87	11 201	12.9	-	-	-	-	-	-	-	-	-	-	-
1966	93	3 452	3.7	-	-	-	-	-	-	-	-	-	-	-
1967	...	...	...	...	...	...	...	...	...	...	...	...	...	...
1968	96	6 771	7.1	-	-	-	-	-	-	-	-	-	-	-
1969	96	12 048	12.6	-	-	-	-	-	-	-	-	-	-	-

a) Uncertain origin.

SURINAM

STATUS OF MALARIA PROGRAM AT DECEMBER 1969



	Population (thousands)	Area km^2
TOTAL COUNTRY	365	163 820
Non malarious areas	130	70
Originally malarious areas		
Maintenance phase	-	-
Consolidation phase	199	49 035
Attack phase	36	114 715
Preparatory phase	-	-
Total originally malarious areas	235	163 750

PERSONNEL

Activity	Professional	Non professional	Total
Spraying operations	1	14	15
Evaluation operations	1	44	45
Administrative and other	1	17	18
Transport	-	72[a)]	72[a)]
Total	3	147	150

TRANSPORT FACILITIES

Type	Spraying Operations	Evaluation Operations	Mixed or other operations	Total
Four-wheel vehicles	-	-	13	13
Two-wheel vehicles	-	20	-	20
Boats	-	-	24	24
Animals	-	-	-	-
Other	-	-	-	-
Total	-	20	37	57

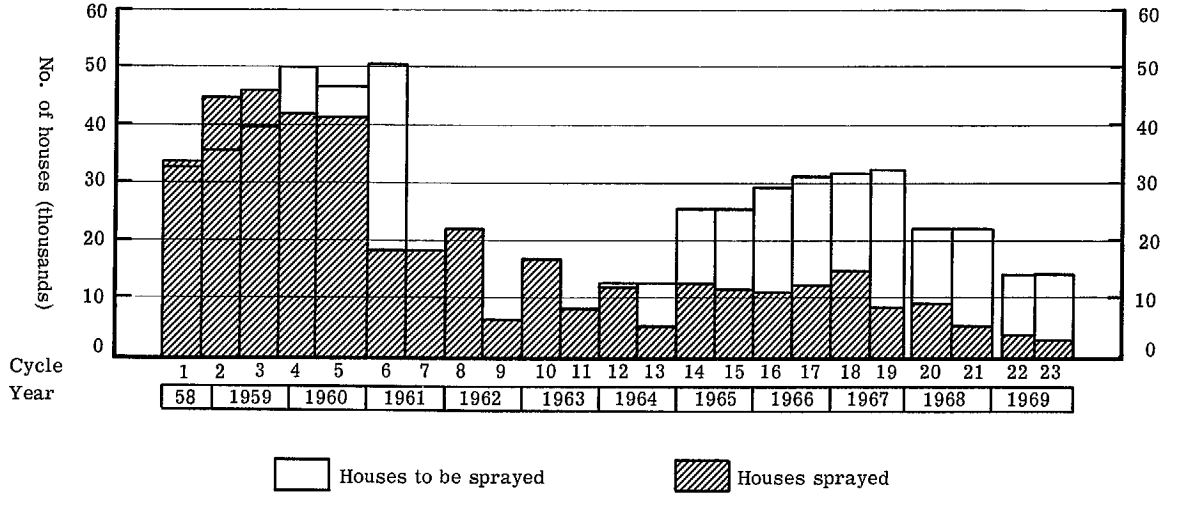
a) Also function as spraymen and medicated salt distributors.

SURINAM (Cont.)

SPRAYING OPERATIONS

Year of total coverage	Date	Houses sprayed						Inhabitants directly protected		Insecticide used per house (g. technical)		Average houses sprayed per spray-man/day
		DDT			Dieldrin							
		Cycle	Planned	Sprayed	Cycle	Planned	Sprayed	Planned	Protected	DDT	Dieldrin	
1st	May 58-Apr. 59	1st	32 722	31 299	1st	(a)	2 554	147 314	152 422	310	58	5.8
		2nd	35 540	40 211			4 930	150 334	190 951	318	60	6.9
2nd	May 59-Apr. 60	3rd	39 683	37 563	2nd	(a)	8 342	149 287	172 694	274	58	8.0
		4th	50 024	37 445			4 713	187 640	158 143	250	57	7.8
3rd	May 60-Jun. 61	5th	46 537	36 861	3rd	(a)	4 571	172 233	153 687	263	65	6.2
		6th	50 652	16 298			2 187	138 229	50 462	211	56	6.0
4th	Jul. 61-Jun. 62	7th	18 485	15 533	-	-	1 320	47 746	43 526	211	54	5.7
		8th	22 351	12 984			-	57 732[b]	33 537[b]	-	-	...
5th	Jul. 62-Jun. 63	9th	...	6 397	-	-	-	...	16 523[b]	-	-	...
		10th	...	16 681				...	42 558			
6th	Jul. 63-Jun. 64	11th	...	8 458	-	-	-	...	19 164	-	-	...
		12th	12 824	5 603	1st	(a)	6 605	29 300	27 893	175	61	6.5
7th	Jul. 64-Jun. 65	13th	12 824	682	2nd	(a)	4 708	28 693	12 060	217	62	6.3
		14th	25 648	1 813	3rd	(a)	10 969	52 873	26 350	191	66	7.8
8th	Jul. 65-Jun. 66	15th	25 648	11 550	4th	(a)	(a)	58 279	25 260	...	...	...
		16th	29 486	1 488	5th	(a)	10 394	55 319	22 292	164	84	6.4
9th	Jul. 66-Jun. 67	17th	31 546	3 662	6th	(a)	8 975	73 953	29 625	161	76	6.3
		18th	31 950	3 320	7th	(a)	11 754	...	37 096	179	77	6.5
10th	Jul. 67-Jun. 68	19th	32 542	1 774	8th	(a)	6 837	...	16 239	149	73	6.3
		20th	22 406	2 277	9th	(a)	7 319	54 981	17 200	141	84	5.0
11th	Jul. 68-Jun. 69	21st	22 406	1 653	10th	(a)	4 033	54 981	9 719	169	77	5.1
		22nd	14 550	340	11th	(a)	3 595	36 250	3 314	181	65	5.3
12th	Jul. 69-Dec. 69	23rd	14 550	399	12th	(a)	2 898	36 250	2 202	220	61	6.1

a) Included in DDT column. b) Estimated.



SURINAM (Cont.)

EPIDEMIOLOGICAL EVALUATION OPERATIONS, ATTACK PHASE AREAS

Year	Slides examined			Species found		
	Total No.	Positive		P. falciparum	P. vivax	P. malariae
		Number	Percentage			
1958[a]	23 137	2 288	9.9	2 220	48	20
1959	46 687	2 703	5.8	2 343	30	330
1960	45 396	997	2.2	912	3	82
1961	21 530	620	2.9	573	-	47
1962	18 794	694	3.7	676	-	18
1963	28 835	1 849	6.4	1 817	7	25
1964	23 186	1 643	7.1	1 615	4	24
1965	27 378	4 237	15.5	4 213	7	17
1966	28 374	2 882	10.2	2 831	8	43
1967	16 991	1 761	10.4	1 741	1	19
1968	22 284	1 530	7.0	1 517	1	12
1969	23 289	671	2.9	666	4	1

CONSOLIDATION PHASE AREAS

Year	Estimated population in the area (thousands) (b)	No. of slides examined (c)	% of population sampled (annual rate)	Total No. of positive cases (c)	Origin of infections							Species of parasite		
					Autochthonous	Relapsing	Imported		Induced	Introduced	Not investigated and unclassified	P. falciparum	P. vivax	P. malariae
							from abroad	from areas within country						
1961	225	14 894	6.6	26	-	-	-	26	-	-	-	23	-	3
1962	240	19 025	7.9	22	-	1	-	21	-	-	-	17	-	5
1963	240	38 861	16.2	33	-	-	-	33	-	-	-	28	3	2
1964	253	53 369	21.1	38	-	-	-	38	-	-	-	35	1	2
1965	262	20 366	7.8	74	-	-	-	74	-	-	-	69	-	5
1966	277	7 411	2.7	51	-	-	-	49	-	-	2	47	3	1
1967	281	8 488	3.0	25	1	-	-	24	-	-	-	25	-	-
1968	303	13 055	4.3	25	-	-	4	17	-	-	4	24	1	-
1969	199[d]	14 905[d]	7.5	70[d]	22	1	-	15	-	4	28	68	2	-

a) May-December. b) Includes the population of the city of Paramaribo, originally non-malarious area. c) Includes slides taken and positives found in Paramaribo, originally non-malarious area. d) Consolidation phase only.

II. SPECIAL TECHNICAL PROBLEMS

A. General Status

As previously reported, the most widely recognized technical problem has been the physiological resistance of the vector to the insecticides commonly in use, i. e. DDT and dieldrin. This problem, observed initially in Mexico, Guatemala, Honduras, El Salvador, and Nicaragua in areas of the Pacific Coast, has now gradually extended to interior regions of the countries. Recently, this problem has also been identified in a limited foci in Haiti. Expansion of resistance has been noticed especially in El Salvador and Nicaragua. In Nicaragua, the vector became resistant to malathion which was used as an alternative insecticide in area of high resistance to dieldrin and DDT.

More difficult to quantify, but undoubtedly of considerable importance as contributing causes of persistent malaria transmission, are problems of relatively high man-vector contact and low vector-insecticide contact originating from vector behaviour alone or in combination with human habits.

In Panama, for the first time in Middle America, the chloroquine-resistant strain of P. falciparum was reported in some localities. Further investigation is under way to determine the grade of resistance and its geographical extension. The distribution of the chloroquine resistant strains of P.falciparum currently known in the Americas is shown in Map 3.

Other problem related to human ecology continued adversely to affect the rate of progress of the malaria eradication programs. These include populations living in relatively inaccesible areas such as in isolated localities in the Amazon Basin; migration of laborers such as in cotton growing areas in Central America; and colonization of new lands for agricultural development. Such factors, together with anthropological differences, contribute to difficulties in protecting populations by residual house spraying.

B. Activities for solving technical problems

1. Use of alternative insecticides

Since 1961, malathion has been in use in Nicaragua as an alternative insecticide in the area of high vector resistance to dieldrin and DDT, and has been supplemented by mass drug administration in localities of high endemicity. This combination of measures has not been effective in interrupting malaria transmission under the conditions prevailing in the country. Furthermore, the vector was also found to be resistant to malthion early in 1969.

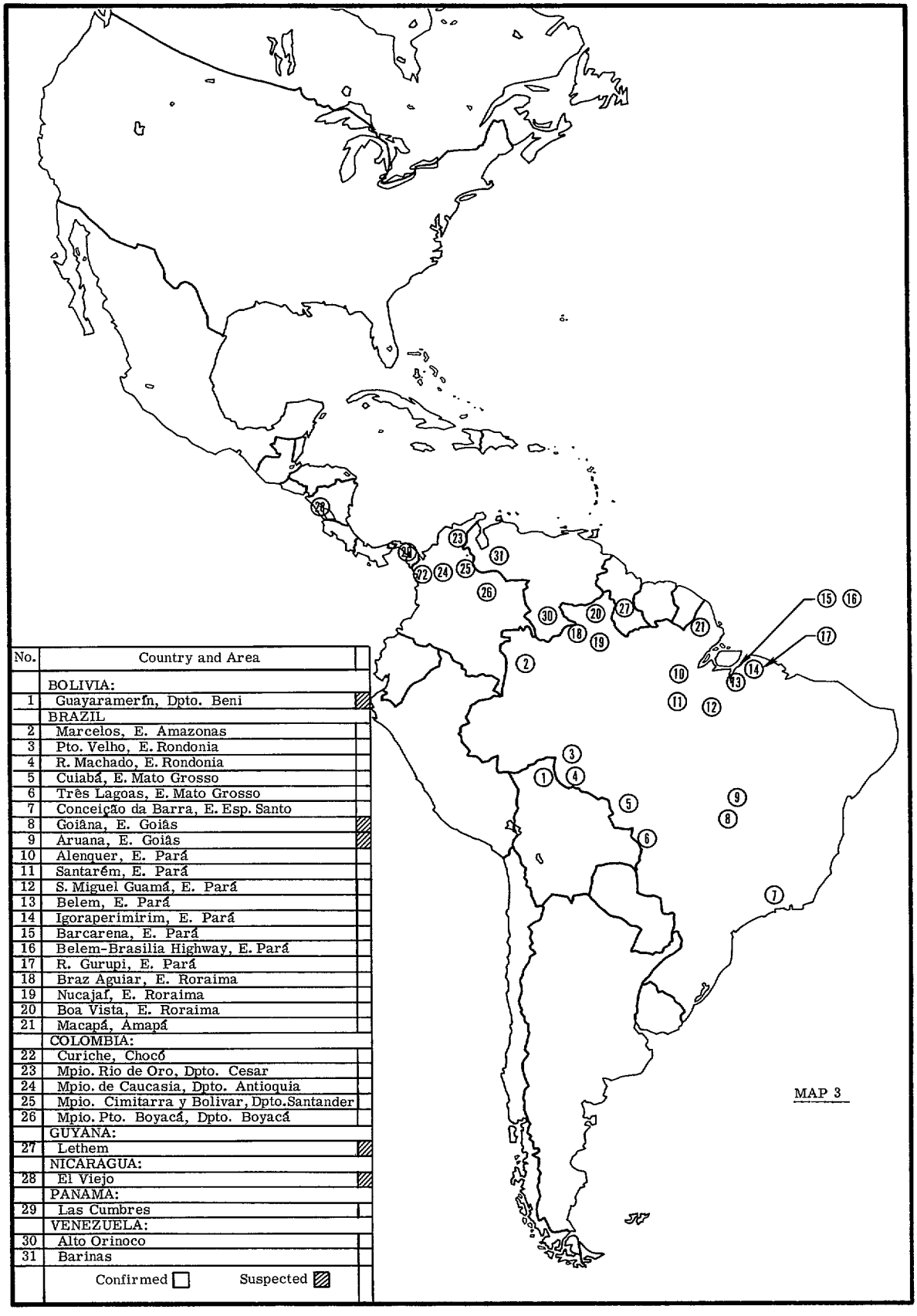
During the year, several meetings were held among the Governments in Central America and the assisting International Agencies to consider the use of OMS-33 (Baygon) as an alternative insecticide. In view of the good results obtained in the cooperative field trial in El Salvador conducted by that Government and the PAHO Research Team, agreement was reached to try this insecticide in the areas in the Central American countries where the vector is highly resistant to DDT and dieldrin.

2. Larviciding

Larviciding activities were continued in Nicaragua in 8 localities (cities or towns) with a total population of 391,737. Operational problems in relation to supervision and discovery of potential breeding places made it difficult to treat the areas adequately. Larviciding in combination with drainage showed promise in attacking a foci in Haiti.

Map 3

AREAS WHERE CASES OF FALCIPARUM "RESISTANT" TO FOUR AMINOQUINOLINES HAVE BEEN NOTIFIED



No.	Country and Area
	BOLIVIA:
1	Guayaramerín, Dpto. Beni
	BRAZIL
2	Marcelos, E. Amazonas
3	Pto. Velho, E. Rondonia
4	R. Machado, E. Rondonia
5	Cuiabá, E. Mato Grosso
6	Três Lagoas, E. Mato Grosso
7	Conceição da Barra, E. Esp. Santo
8	Goiâna, E. Goiás
9	Aruana, E. Goiás
10	Alenquer, E. Pará
11	Santarém, E. Pará
12	S. Miguel Guamá, E. Pará
13	Belem, E. Pará
14	Igoraperimirim, E. Pará
15	Barcarena, E. Pará
16	Belem-Brasilia Highway, E. Pará
17	R. Gurupi, E. Pará
18	Braz Aguiar, E. Roraima
19	Nucajaí, E. Roraima
20	Boa Vista, E. Roraima
21	Macapá, Amapá
	COLOMBIA:
22	Curiche, Chocó
23	Mpio. Rio de Oro, Dpto. Cesar
24	Mpio. de Caucasia, Dpto. Antioquia
25	Mpio. Cimitarra y Bolivar, Dpto. Santander
26	Mpio. Pto. Boyacá, Dpto. Boyacá
	GUYANA:
27	Lethem
	NICARAGUA:
28	El Viejo
	PANAMA:
29	Las Cumbres
	VENEZUELA:
30	Alto Orinoco
31	Barinas

Confirmed ☐ Suspected ▨

MAP 3

3. Mass drug administration

Since the beginning of 1968, mass drug administration has been applied as a supplementary measure to DDT house spraying in the Central American Countries where malaria transmission has been persistent. Costa Rica has been able to maintain a high percentage (more than 90 per cent) of acceptance of drugs by the population and, as a result of the combined measures, have succeeded in virtually interrupting transmission. However, in the other four countries of Central America where the acceptance of the drugs was about 50 per cent the same combination of attack measures was merely able to maintain the malaria incidence at a relatively low level (Table 22).

In Panama, mass drug administration was initiated in September 1969 in two main foci of persistent malaria transmission, i. e. Baru with 23,566 inhabitants and Los Lagos with 4,884. In both areas, an average of 90 per cent of the population was treated in each cycle between September and December, 1969. In the area of Baru, where the positivity rate was 0.5 per cent in the initial survey, no more cases were found after the fourth cycle of the treatment. On the other hand, in the area of Los Lagos, the reduction of positivity rate was from 28.1 per cent at the time of the initial survey to only 9.1 per cent at the end of December 1969. In the latter area it is suspected that P. falciparum might be resistant to chloroquine.

In Colombia, mass drug administration was carried out in the area of Bajo Cauca-Nechi during August-December, 1969, using the combination of chloroquine and pyrimethamine at 14 day intervals. An average of 80 per cent of the people was treated in each cycle and the positivity rate was reduced from 40.1 per cent in the initial survey to 14.0 per cent at the end of October 1969.

In summary, mass drug administration, as used as a complementary measure, was effective in Costa Rica and Baru, Panama, where the population coverage was more than 90 per cent, malaria parasites were susceptible and the potential for transmission was not high. In areas where these conditions are partially or totally lacking, the distribution of anti-malarial drugs merely reduced the number of malaria cases.

Table 22

MASS DRUG PROGRAMS IN THE AMERICAS, 31 DECEMBER 1969

Country and name of area	Population	Area Km^2	Drug used	Drug cycle	Number of cycles 31 Dec.1969	Population treated (percentage)	Slides examined	Positive cases		
								P. falciparum	P. vivax	Total
Colombia										
Bajo Cauca	26 409	4 500	Chloroquine + Pyrimethamine	14 days	9	69.7	5 561	660	266	926
Costa Rica										
Central Pacific Coast	31 687	986	Chloroquine + Primaquine	14 days	34	94.7	6 350	-	-	-
Paquera	1 816	51		"	13	93.2	389	-	-	-
Golfito	3 850	85		"	10	96.7	1 530	-	-	-
Total	37 353									
El Salvador	344 587	3 705	Chloroquine + Primaquine	14 days	24	61.6	102 609	512	2 402	2 914
Guatemala										
South Pacific Cost	155 675	5 500	Chloroquine + Primaquine	14 days	25	42.9	87 467	74	2 667	2 741
North: Sebol	15 199	400		14 days	25	67.2	12 285	1	1 142	1 143
North: Polochic	27 398	1 100		28 days	10	76.5	12 187	-	112	112
Total	198 272									

Table 22 (Cont.)

MASS DRUG PROGRAMS IN THE AMERICAS, 31 DECEMBER, 1969

Country and name of area	Population	Area Km^2	Drug used	Drug cycle	Number of cycles 31 Dec.1969	Population treated (percentage)	Slides examined	Positive cases		
								P. falciparum	P. vivax	Total
Honduras										
District I	16 216	364		14 days	119	47.0	5 818	592	1 045	1 637
District II	16 966	377		"	69	32.0	3 996	76	749	825
District III	23 244	584	Chloroquine	"	65	37.0	6 292	187	1 344	1 531
District IV	28 358	729	+ Primaquine	"	60	38.0	7 681	408	577	985
District V	25 073	1 013		"	60	42.0	7 574	526	1 233	1 759
District VI	18 998	1 695		"	32	80.0	2 945	67	201	268
Total	128 855									
Nicaragua										
Districts 1-4	80 300	4 242	Chloroquine	14 days	55	51.5	17 163	946	648	1 594
Districts 5-12	155 919	8 014	+ Primaquine	"	51	55.2	18 922	142	821	963
Districts 13-14	31 612	1 155		"	14	57.6	3 727	-	108	108
Total	267 831									
Panama										
Baru	23 566	800	Chloroquine	14 days	6	90.0	4 158	-	6	6
Lagos	4 884	200	+ Primaquine	"	6	90.0	2 460	494	-	494
Total	28 450									
Peru										
Ene	3 372	5 500	Chloroquine	30 days	11	61.2	4 724	-	102	102
Satipo	853	200	+ Primaquine	"	9	96.0	1 471	-	17	17
Total	4 225		+ Pyrimethamine							

III. RESEARCH

Research in Malaria Eradication has continued to be oriented towards the solution of problems encountered by the country programs.

Within the limited resources available, the Organization has sponsored and conducted research to resolve these problems. In addition, it has maintained liason with other research agencies; namely the USPHS/CDC Central American Research Station in El Salvador, with the objective of exchanging information and coordinating research activities.

These research activities can be classified, according to fields of investigation, into the following categories:

A. Evaluation of Insecticides

1. Evaluation of OMS-33 (Baygon)

Since April 1966, PAHO/WHO Projects, AMRO-0209 and AMRO-0216, have conducted a large scale field trial in El Salvador for the evaluation of the carbamate insecticide OMS-33. This trial included epidemiological evaluation, although the main purpose was to study the insecticide application from the entomological, toxicological and operational points of view.

An area of about 250 Km^2 on the Southeast Pacific coast of El Salvador with a population of 16,500 inhabitants was sprayed with OMS-33 WDP 50 per cent at a dosage of 2 g/m^2 of technical material on quarterly cycles, from April 1966 to February 1969. The results indicate that transmission might have been completely interrupted in the whole area if no influence from the surroundings had occurred. The occassional transmission which occurred in some parts of the area can be attributed to the considerable movement of population. The high rate of renovation of walls and roofs and the shorter duration of the insecticidal effect during the dry season were also contributory factors.

OMS-33 has a considerable air-borne insecticidal effect which can be detected even outside the sprayed houses. This effect will not only be very useful in areas where houses have no or very rudimentary walls, but may lead to an economy of the insecticide by partial spraying of the houses. During 1969 a locality scale field trial was carried out to test this hypotheses by partial spraying of houses with OMS-33 at several dosages. The results led to the selection of an average dosage of 60 g/house every 35 days to be tested on a large scale in 1970.

The intradomiciliary spraying of OMS-33 has a pronounced effect on other arthropods. Consequently, it might be of wide public health importance.

The Central American Malaria Research Station has initiated some studies on the effect of exterior treatment of houses with OMS-33 at 2 g/m^2 and DDT at 4 g/m^2, which suggest that biting densities in the OMS-33 treated houses were reduced for six to eight weeks. Further studies of this method of application will be carried out in 1970.

2. Studies of other insecticides

Previous entomological observations in Colombia seem to indicate that the addition of small quantities of BHC to normal doses of DDT increased considerably the killing effect on A. darlingi. As a result, the malaria eradication program of Colombia initiated a comparative study in July 1969, of the effects of four spraying schemes:

a) Semestrial cycle of DDT 2 g/m^2.

b) Semestrial cycle of DDT 2 g/m^2, plus BHC 0.1 g/m^2.

c) Trimestrial cycle of DDT 1 g/m^2.

d) Trimestrial cycle of DDT 1 g/m^2, plus BHC 0.1 g/m^2.

The Central American Malaria Research Station initiated a village scale trial or carbaryl (OMS-29) which will continue in 1970.

3. Ultra-low-volume application of insecticide

Preliminary studies were carried out by the Central American Research Station in collaboration with the Malaria Project in El Salvador. An area of 3,000 acres in the coastal plains was treated by three initial weekly applications followed by successive ones at 17 or 18 days intervals. Malathion concentrate (technical) at a rate of 3 fluid ounces per acre was applied using a C-47 aircraft flying 160 mph at 125 ft. altitude. Despite adequate insecticide distribution as shown by dye cards, mortality of A. albimanus was considered unsatisfactory. Susceptibility tests confirmed that the wild population was moderately to highly resistant to malathion.

B. Investigations in Chemotherapy

1. Evaluation of Cycloguanil Pamoate

This project was carried out between 1967 and 1969 in an area of new settlement on the Pacific coast of Guatemala, having a population of about 12,000 inhabitants and an area of 230 Km^2. It has constituted an independent activity of the malaria eradication service financially and technically assisted by PAHO/WHO.

During the period of study the population received four intramuscular injections of cycloguanil pamoate at six months intervals, the last being completed in February 1969. While the coverage in each treatment round, ranged from 74 to 81 per cent, a longitudinal study of a sample of the population showed that the proportion receiving repeated treatments was much less than expected; this is considered to be due mainly to the high turnover of the population. In addition, the age and sex distribution of treated persons indicated high avoidance of treatments by some groups, especially adult males. There was no evidence of generalized alergic reactions, nevertheless, more than half of the subjects had some local feeling of pain on walking or tenderness to pressure.

Epidemiological observations showed that the results obtained in the trial area were similar to those observed in the surrounding areas under mass distribution of chloroquine, i. e. decrease in parasite incidence after the first treatment followed by levelling from there on. The final report of the trial is under preparation.

2. Response of P. falciparum to chloroquine

Between March and May 1969 a field study was conducted in Brazil to determine whether the sensitivity of P. falciparum to chloroquine could be assessed by a simple "in vitro" method (described by Rieckmann et al, 1968) under field conditions. The study was carried out in Cuiaba, Mato Grosso. A comparative study was completed in 30 patients in whom the "in vitro" test was followed by the standard WHO "in vivo" test of susceptibility to chloroquine. The "in vitro" findings suggested that all cases were infected with chloroquine resistant strains of P. falciparum, and was confirmed by the "in vivo" test except for two cases that showed a susceptible response; the two persons had a previous history of recent repeated episodes of fever.

This study suggests that the "in vitro" test is a practical method for determining the presence or prevalence of chloroquine resistant parasites. It may also provide a more accurate means for assessing or comparing sensitivity than the "in vivo" test, since its results are much less influenced by the immunity status of the patient. It is necessary nevertheless, to study further the "in vitro" tests to determine the level of response of susceptible parasites.

3. Study on the response of P. vivax to single dose treatment

The following drugs, or drug associations, were studied in Brazil in relation to the immediate response of P. vivax to a single dose treatment, its relapse rate and latent period:

a) Chloroquine at dose (base) of 10 mg/kg.

b) Association of pyrimethamine 0.85 mg/kg. and sulfadoxine 24 mg/kg.

c) Association of chloroquine 5 mg. (base) kg, pyrimethamine 0.85 mg/kg., primaquine 0.50 mg/kg. and sulfadoxine 10 mg/kg.

Scheme b) produced a very slow immediate response and therefore was considered inadequate. Schemes a) and c) gave similar immediate responses, of clearance of 2/3 to 3/4 of parasitaemias in 48 hours, and a similar relapse rate, but the latent period was significantly longer with scheme c) than a).

4. Radical cure for P. vivax

A trial of a three day administration of chloroquine, primaquine and pyrimethamine as a possible radical cure of P. vivax was carried out in Colombia. The results are being analyzed.

5. Project of mass radical treatments for elimination of residual foci of malaria

This project, will be carried out as a project of incidental research by the Malaria Eradication Program of Bolivia and has as its objective the study of the possibility of using a combination of chloroquine-primaquine-pyrimethamine as a three days treatment to eliminate residual foci in the Andes Valleys in South Bolivia.

The plan of operations was prepared and signed in 1969 and the work will start in 1970.

6. Studies on mass drug administration

The Central American Malaria Research Station carried out comparative field trials of mass drug administration of pyrimethamine and primaquine versus amodiaquine and primaquine in one area in El Salvador, and amodiaquine base and primaquine versus amodiaquine hydrochloride and primaquine in another area. None of these drug combinations seem to improve drug acceptance and a detailed study is being carried out to ascertain the anthropological factors which may influence drug acceptance, and the possibility of counteracting them through a health education program in the schools.

Amodiaquine base and primaquine were also used as mass drug administration in a small area in Costa Rica with good results.

C. Entomological Studies

1. Vector behaviour

Studies were carried out by the Malaria Projects in Colombia, Brazil, El Salvador, and Venezuela to determine behavioural factors which may influence the man-vector and vector-insecticide contacts.

2. Vector ecology

Studies of the seasonal ecology and resting habits of various anophelines have been carried out by several Malaria Projects and the Central American Research Station. This latter institution also studied estuarine breeding places in El Salvador to determine the influence of variations in salinity on vector breeding.

3. Vector genetics.

The Organization gave assistance to a study of the cytogenetics of South America anophelines, especially of the Subgenera Nyssorhynchus and Kerteszia. This study is being carried out by Professor J. B. Kitzmiller of the University of Illinois.

D. Parasitological Studies

1. Field study of diagnostic methods

A field study has been initiated to compare the relative diagnostic values of microscopic examination of thick blood films and fluorescent antibodies techniques. The study will be carried out by the Malaria Eradication Program of the State of São Paulo (Brazil) in cooperation with the Institute of Tropical Diseases of the University of São Paulo and PAHO. The necessary equipment has been provided by PAHO. The Institute of Tropical Diseases has started to produce malaria antigens.

2. Characterization of strains of malaria in Central America

The Central American Malaria Research Station in collaboration with the U.S. National Institutes of Health has innoculated human plasmodia in Aotus monkeys for further studies on their relapse patterns and other strain characteristics.

E. Investigation of the Economic Effects of Malaria

This project is being carried out in eight local areas in east Paraguay to estimate the economic impact of malaria on 320 selected agricultural families and 15 small rural industries. The study will investigate if there are any differences in the economic development between those affected and those little or not affected by the disease during the period of study. Planning of the project began in March, 1968. Field collection of data started in September of 1968 and will continue for 18 months.

IV. INTERNATIONAL COOPERATION

Table 23 summarizes the number of PAHO/WHO malaria personnel by professional discipline in each malaria eradication project. It also includes those assigned to interzone, intercountry, and research projects. Due to limitations of funds, the total number of PAHO/WHO personnel was somewhat reduced in 1969 primarily in the category of sanitary inspectors. Studies are being carried out to review the needs for advisory services in each project and to reorganize the distribution of PAHO/WHO personnel in accordance with the status of the program and the availability of national technical personnel.

Medical supplies furnished annually by PAHO/WHO from 1958 through 1969 are shown in Table 24. In addition to the medical supplies; PAHO/WHO provided a few vehicles and small quantities of laboratory and entomological supplies during 1969.

There is no training center for malaria eradication personnel directly sponsored by PAHO. However, under the auspices of the Government of Venezuela, its training center in Maracay continues to hold an international malaria training course every year, starting in November and terminating in March in the following year. The Government of Venezuela, in addition to providing training facilities, gives 6 fellowships every year to candidates sent by PAHO. The fellowships provide stipends and local traveling expenses. PAHO pays international travel and other expenses not covered by the Government. For trainees in excess of those assisted by the Government, PAHO provides complete fellowship assistance. For the course of 1968/1969, PAHO arranged to send 9 trainees (Argentina 1, Bolivia 2, Colombia 3, Honduras 1, Paraguay 1, and Peru 1). For the 1969/1970 course, 11 trainees (Bolivia 1, Colombia 3, Ecuador 1, El Salvador 2, Guatemala, 1, Haiti 1, and Honduras 2) were sent.

Assistance provided by PAHO/WHO, UNICEF and USAID during 1969, and their estimated contributions for 1970, are shown in Table 25. The proportion of the national and international contributions to the malaria eradication programs in the Americas is illustrated in Graph 3. Although the international contributions in terms of dollar values are relatively small in comparison with the national expenditures, their catalytic effect in promoting the increase of manpower, the provision of essential materials from abroad, and the complementary payments of local costs are essential to the progress of the malaria eradication programs.

Table 23

PAHO/WHO FULL-TIME PROFFESIONAL AND TECHNICAL STAFF ASSIGNED TO COUNTRY, INTER-COUNTRY, AND INTER-ZONE MALARIA ERADICATION PROGRAMS IN THE AMERICAS, FROM 1967 TO MAY 1970*

Country or other political unit	Medical Officers				Sanitary Engineers				Sanitary Inspectors				Entomologists				Others			
	1967	1968	1969	1970	1967	1968	1969	1970	1967	1968	1969	1970	1967	1968	1969	1970	1967	1968	1969	1970
Argentina	1	1	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Bolivia	1	1	1	1	-	-	-	-	3	3	1	1	-	-	-	-	-	-	-	-
Brazil	5	5	4	4	1	1	1	1	4	5	5	4	2	2	2	2	4a)	2b)	2b)	2b)
Colombia	2	1	2	2	1	1	1	1	4	4	3	1	1	1	1	1	-	-	-	-
Costa Rica	1	1	1	1	-	-	-	-	3	2	1	1	-	-	-	-	-	-	-	-
Dominican Republic	1	1	1	1	-	-	-	-	2	1	-	-	-	-	-	-	-	-	-	-
Ecuador	-	1	1	1	1	-	-	-	3	3	2	2	-	-	-	-	-	-	-	-
El Salvador	2	2	2	2	-	1	1	1	3	2	2	1	-	-	-	-	-	-	-	-
Guatemala	2	2	2	2	1	1	1	1	3	2	2	1	1	1	-	-	-	-	-	-
Guyana	-	-	-	-	-	-	-	-	2	2	1	1	-	-	-	-	1c)	1c)	-	-
Haiti	2	1	1	1	-	1	1	1	4	3	3	2	-	-	-	-	-	-	-	-
Honduras	1	1	1	1	1	-	-	-	1	2	1	1	-	-	-	-	-	-	-	-
Mexico	1	1	2	2	-	-	-	-	1	1	-	-	-	1	-	1	-	-	-	-
Nicaragua	2	2	2	2	1	1	-	-	2	4	2	2	-	-	-	-	-	-	-	-
Panama	1	1	1	1	1	1	1	1	3	3	1	1	1	-	-	-	-	-	-	-
Paraguay	-	1	1	1	1	1	1	1	2	2	2	2	-	-	-	-	-	-	-	-
Peru	1	1	1	1	1	1	1	1	3	3	2	1	-	-	-	-	-	-	-	-
British Honduras	-	-	-	-	-	-	-	-	1	1	1	1	-	-	-	-	-	-	-	-
Surinam	1	1	-	-	-	-	-	-	3	3	1	1	-	-	-	-	-	-	-	-
Inter-zone and inter-country projects	9	8	9	10	1	1	1	1	-	-	-	2	2	2	1	1	8d)	4e)	5f)	4g)
Total	33	32	33	33	10	10	9	9	47	46	30	25	7	7	4	5	13	7	7	6

* As of 31 December of each year.

a) Three administrative officers and one assistant engineer. b) Two administrative officers. c) Laboratory technician. d) One statistician, two administrative officers, two entomological assistants, one entomological aide, one programmer analyst,and one health educator. e) Two statisticians and two administrative officers. f) One economist, one programmer analyst, two administrative officers, and one laboratory technician. g) One economist, two administrative officers, and one laboratory technician.

Table 24

DRUGS PROVIDED BY PAHO TO MALARIA ERADICATION PROGRAMS IN THE AMERICAS, 1958-1969

(In thousands of tablets)

Country or other political unit	Total 1958-1968							1969						
	Chloroquine 150 mg.	Primaquine		Pyrimethamine 25 mg.	Combined drug a)	Aspirin		Chloroquine 150 mg.	Primaquine		Pyrimethamine 25 mg.	Combined drug a)	Aspirin	
		15 mg.	5 mg.			0.50 g.	0.20 g.		15 mg.	5 mg.			0.50 g.	0.20 g.
Argentina	1 490	190	90	612	-	-	-	163	58	50	100	-	-	-
Bolivia	4 225	365	204	242	310	200	-	1 455	295	176	287	-	-	-
Brazil b)	92 470	1 513	775	204	1 600	-	-	-	-	-	6	201	-	-
Colombia	22 695	2 355	830	3 824	4 148	100	20	2 250	50	-	1 160	1 464	-	-
Costa Rica	3 958	663	189	213	1 385	227	81	692	204	158	-	-	-	-
Cuba	3 950	38	69	80	-	-	-	250	-	-	-	-	-	-
Dominican Republic	9 394	38	197	782	-	10	10	2 136	15	15	-	-	-	-
Ecuador	8 616	589	230	275	-	-	-	1 500	80	10	155	-	-	-
El Salvador	12 255	484	660	128	2 070	-	-	1 813	137	-	-	-	-	-
Guatemala	11 719	931	119	77	8 049	-	-	2 242	54	-	-	-	200	50
Guyana c)	736	256	83	267	-	-	-	-	-	3	9	-	-	-
Haiti	6 120	82	-	1 480	30 608	-	-	-	-	-	-	1 000 d)	-	-
Honduras	10 939	1 202	922	88	1 290	-	-	1 535	119	256	-	-	-	-
Jamaica	879	18	-	288	50	-	-	-	-	-	-	-	-	-
Mexico	50 697	4 072	3 151	10 529	4 092	-	-	3 800	4 900	8 966	150	-	-	-
Nicaragua	9 303	847	736	6	6 933	-	-	1 196	701	1 419	-	-	-	-
Panama	3 480	554	228	146	-	-	-	560	260	170	16	1 695	-	-
Paraguay	7 585	128	59	48	-	-	-	936	17	13	-	-	-	-
Peru	20 756	1 009	378	867	1 040	433	40	1 000	100	130	-	-	-	-
Trinidad and Tobago	815	940	419	121	400	112	20	-	-	-	-	-	-	-
British Honduras	325	37	35	6	22	61	79	40	-	-	-	-	-	-
Canal Zone	-	-	-	-	90	-	-	-	-	-	-	-	-	-
Dominica	90	1	1	45	-	40	-	-	-	-	-	-	-	-
French Guiana e)	100	1	-	-	32	-	-	30	10	10	8	8	-	-
Grenada	43	-	-	45	-	20	-	-	-	-	-	-	-	-
St. Lucia	68	1	-	70	-	36	-	-	-	-	-	-	-	-
Surinam f)	1 611	19	16	517	235	75	10	-	40	31	19	-	13	-
Total	284 319	16 333	9 391	20 960	62 354	1 314	260	21 598	7 040	11 407	1 910	4 368	213	50

a) Chloroquine 150 mg./Primquine 15 mg. adult size unless otherwise indicated. b) In addition there were provided 52 000 fanasil tbs. c) There were also provided 1 500 fanasil tablets, 2 000 lbs. Chloroquine diphosphate powder, and 19 lbs. Pyrimethamine powder. d) Chloroquine 200 mg./Pyrimethamine 16.5 mg. e) 920 lbs. Amodiaquine powder were also provided. f) In addition there were provided 2 700 lbs. Amodiaquine powder and 1 503 lbs. Tricalcium phosphate.

Table 25

INTERNATIONAL CONTRIBUTIONS TO MALARIA ERADICATION PROGRAMS IN THE AMERICAS
1969 AND ESTIMATED 1970

(U. S. dollars)

Country or other political unit	Date of initiation of total coverage	1969				1970 (estimated)			
		PAHO	WHO and WHO/TA	UNICEF (a)	AID (USA) (fiscal year)[b]	PAHO	WHO and WHO/TA	UNICEF (a)	AID (USA) (fiscal year)[b]
Argentina	Aug. 1959	22 842	-	20 000	-	26 273	-	-	-
Bolivia	Sep. 1958	60 121	-	33 000	-	45 316	-	42 000	-
Brazil	Aug. 1959	194 489	123 454	-	13 000	340 232	-	-	30 739
Colombia	Sep. 1958	181 391	-	572 000	-	151 757	-	503 000	-
Costa Rica	Jul. 1957	21 823	35 357	38 000	-	-	44 601	(c)	-
Cuba	1962	-	10 150	-	-	-	3 000	-	-
Dominican Republic	Jun. 1958	55 242	-	20 000	-	23 973	-	(c)	-
Ecuador	Mar. 1957	57 199	21 154	394 000	-	44 856	24 000	302 000	-
El Salvador	Jul. 1956	32 665	85 358	238 000	6 000	36 373	73 344	(c)	-
Guatemala	Aug. 1956	46 527	86 257	234 000	-	51 816	49 443	(c)	-
Guyana	Jan. 1947	54 898	-	7 000	-	32 128	-	(c)	-
Haiti	Jan. 1962	87 743	13 782	264 000	1 718 000	98 675	-	292 000	1 393 000
Honduras	Jul. 1959	19 402	46 714	151 000	14 000	-	59 239	(c)	-
Mexico	Jan. 1957	112 677	8 139	-	-	170 197	48 000	-	-
Nicaragua	Nov. 1958	30 349	91 932	118 000	8 000	28 528	78 049	(c)	-
Panama	Aug. 1957	33 959	69 665	138 000	-	43 601	24 000	(c)	-
Paraguay	Oct. 1957	100 607	-	201 000	55 000	89 602	-	225 000	42 608
Peru	Nov. 1957	99 741	-	48 000	-	70 289	-	101 000	-
British Honduras	Feb. 1957	14 932	-	4 000	-	17 628	-	-	-
French Guiana	Sep. 1963	15 988	-	-	-	6 000	-	-	-
Surinam	May 1958	92 157	-	10 000	-	32 128	-	-	-
Inter-country projects and general services		449 356	230 708	-	491 756[d]	679 077	184 627	-	509 239[d]
Total		1 784 108	822 670	2 490 000	2 305 756	1 988 449	588 303	1 465 000	1 975 586

a) Rounded to the nearest hundred; shipping cost not included. b) AID loans are shown in Table 20. c) Requirements covered by funds previously allocated. d) Includes the Regional Office for Central America and Panama, the Regional Evaluation Office, and the Central America Malaria Research Station.