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STATUS OF MALARIA ERADICATION IN THE AMERICAS

XXI REPORT

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## REPORT ON THE STATUS OF MALARIA ERADICATION IN THE AMERICAS

### XXI REPORT

#### Introduction

The Director of the Pan American Sanitary Bureau has the honor to submit to the XXII Meeting of the Directing Council the XXI Report on the Status of Malaria Eradication in the Americas.

During the Third Special Meeting of Ministers of Health of the Americas, which took place in Santiago, Chile, in October 1972, the progress of the malaria eradication campaigns in the Hemisphere was reviewed, and problems were analyzed. In the light of the progress achieved and under the prevailing conditions, the following targets were established for the present decade:

- "1. Avoid the reintroduction of malaria in the areas containing 81.1 million inhabitants where it has been eradicated.
2. Achieve eradication in areas containing 74.5 million inhabitants where there are good possibilities for doing so with available resources.
3. Interrupt or focalize transmission in areas containing 12.4 million inhabitants where satisfactory progress has not been possible due to financial problems.
4. Reduce transmission to the lowest possible level in areas containing 17.3 million inhabitants where progress depends upon the solution of serious operative or technical problems.
5. Increase coordination of antimalaria services with institutions such as the following, whose activities may have an influence on the incidence of malaria:
  - a) With the general health services, with a view to establishing an adequate surveillance system suited to the epidemiological characteristics of each area.
  - b) With the urban and rural development services, to reduce or eliminate vector breeding areas.
  - c) With the agricultural and livestock services, to regulate the use of insecticides.
6. Ensure the financing of malaria eradication programs through the permanent and flexible participation of international agencies in the form of financial resources, equipment and material, and the creation of emergency funds.
7. Intensify intercountry cooperation to ensure, particularly in border areas, the harmonious development of the different phases of the malaria eradication campaign to be achieved during this decade, including research activities."

It is expected that, with sufficient resources, malaria can have been eradicated by the end of the decade in areas where in December 1971, 168.2 million inhabitants lived (90.7 per cent of the current population of the originally malarious area in the Americas). For 9.3 per cent (17.3 million persons), the final solution to the problem depends upon the possibility of applying more efficient methods against the vector, against the parasite, or for the susceptible individual, with the aim of effectively breaking some link in the transmission chain. The strategy must be flexible and adapted to epidemiologic conditions in each area.

From 17 July to 19 August, an independent multidisciplinary group (one public health administrator, one sanitary engineer, one economist and one malariologist), upon invitation from the Pan American Sanitary Bureau, reviewed the malaria programs of Guatemala, El Salvador, Honduras and Nicaragua. They considered the technical administrative and financial factors that influence the development of these programs, taking into account the socio-economic development

of the countries and the trends of their economic growth. The multidisciplinary group analyzed the economic and social repercussions of malaria in relation to the investments made and concluded that, for every dollar invested in the malaria eradication programs in 1971, the Governments obtained an economic benefit equivalent to USA\$14.76. The Group's report and plan of operations was presented at a Special Meeting of the Ministers of Health of the Central American countries and Panama in March 1973, and the Ministers resolved that it is necessary to intensify the antimalarial operations known to be most effective in interrupting malaria transmission and to continue research towards obtention of complementary or alternative attack measures presently available for application in areas with technical problems. As regards financing, they agreed to solicit outside help in the form of grants or loans, if necessary.

A group of consultants prepared the specific report to include Cuba in the WHO Official register of areas where malaria has been eradicated and recommended inclusion in the Register; the recommendation was supported by the Director of PASB and WHO's Division of Malaria and other Parasitic Diseases.

In pursuance of Resolution WHA22.39 by the Twenty-second World Health Assembly, a multidisciplinary strategy review was conducted in Paraguay and in Mexico. In each one of these countries the progress of the program since its initiation was carefully examined and a plan for future activities was recommended taking into account available resources and existing epidemiological conditions.

This report consists of four chapters. The first contains information on the status of the program in general and country-by-country summaries of progress. The second chapter describes special technical problems which have arisen and the application of measures to resolve them. The third summarizes research on new methods to interrupt malaria transmission and investigations on epidemiological factors associated with this disease. The fourth and final chapter refers to international cooperation in malaria eradication programs.

Information was provided by the countries in an annual questionnaire and in periodical statistical reports, supplemented by data from research reports and by information obtained in the countries by consultants of PAHO Headquarters.

## I. STATUS OF MALARIA ERADICATION PROGRAMS

### A. General situation

There exist 47 political units in the Americas, of which 34 have originally malarious areas. Actually, 12 units: Cuba, Chile, Dominica, Grenada and Carriacou, Guadeloupe, Jamaica, Martinique, Puerto Rico, St. Lucia, Trinidad and Tobago, United States of America and the Virgin Islands (USA) have achieved malaria eradication in their entire territories and are in the maintenance phase.

Of the remaining 22 political or administrative units, three (Argentina, Guyana and Canal Zone) have placed their entire territories in the consolidation and/or maintenance phase. During the year, efforts were continued towards eliminating some active foci of infection stemming from imported cases.

In the malarious area of the remaining 19 political units, malaria eradication is well-advanced in six (Belize, Costa Rica, Dominican Republic, French Guiana, Panama and Paraguay), and marked reduction of malaria incidence was observed in nine (Bolivia, Ecuador, El Salvador, Guatemala, Honduras, Mexico, Nicaragua, Surinam and Venezuela). However, an increase in the number of malaria cases was recorded in four (Brazil, Colombia, Haiti and Peru).

The estimate population of the Americas at 31 December 1972 was 524,774,000, of which 190,448,000 (36.2 per cent) reside in originally malarious areas. Of the latter figure, 86,634,000 (45.5 per cent) reside in areas in the maintenance phase; 42,016,000 (22.0 per cent) in the consolidation; 61,645,000 (32.4 per cent) in areas in the attack phase and 153,000 in areas in which a program has not been initiated (0.1 per cent). The distribution of population by country and by program phase is shown in Table 11.



Table 1

**EVOLUTION OF MALARIA ERADICATION IN THE  
AMERICAS, BY PHASE 1958-1972**

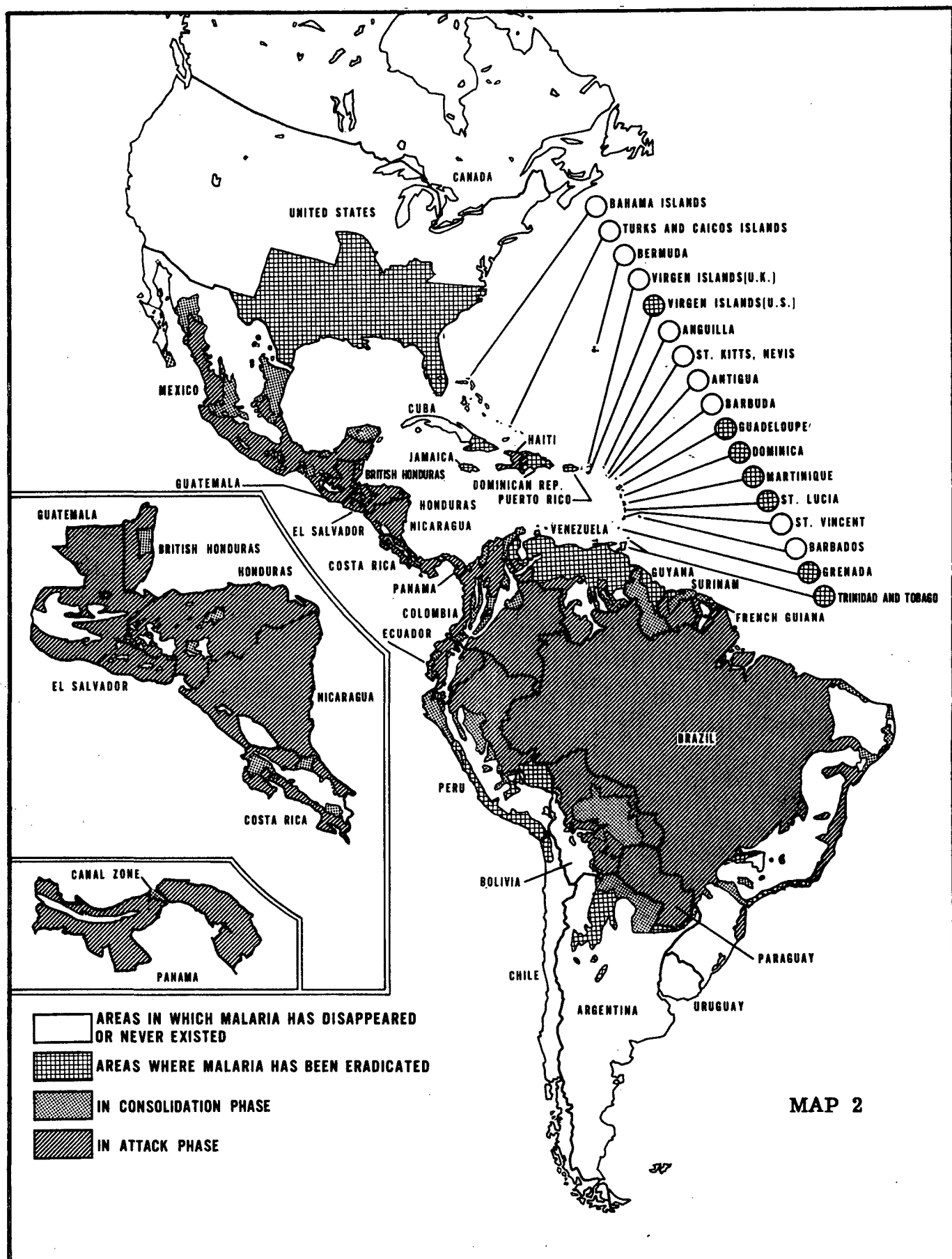
(Population in thousands)

Year	Originally malarious areas					Total population
	Maint. phase	Consolid. phase	Attack phase	Prep. phase or program not yet started	Total	
1958	52 866	1 996	46 196	34 351	135 409	387 276
1959	52 856	9 349	56 292	27 423	145 920	394 606
1960	54 363	10 101	53 400	25 722	143 586	400 500
1961	56 979	17 879	39 021	33 413	147 292	416 008
1962	59 299	30 424	49 276	14 743	153 742	427 919
1963	56 546	33 901	31 910	29 664	152 021	434 950
1964	57 414	32 277	34 426	34 525	158 642	447 666
1965	60 975	34 731	38 575	12 108	146 389	455 527
1966	69 760	36 128	43 369	17 212	166 469	463 649
1967	70 720	41 581	44 766	12 834	169 901	474 868
1968	72 441	45 812	56 234	217	174 704	484 664
1969	72 757	46 987	56 375	206	176 325	491 483
1970	80 770	40 518	59 807	162	181 257	505 819
1971	81 306	43 644	60 396	146	185 492	513 544
1972	86 634	42 016	61 645	153	190 448	524 774

Considering the Hemisphere by geographic regions (Graph No. 1) the whole of North America is in the maintenance phase. In Middle America (Mexico, Central America, Panama and the Caribbean Islands) 47.2 per cent of the population are in the consolidation and maintenance phase and in South America, 57.5 per cent.



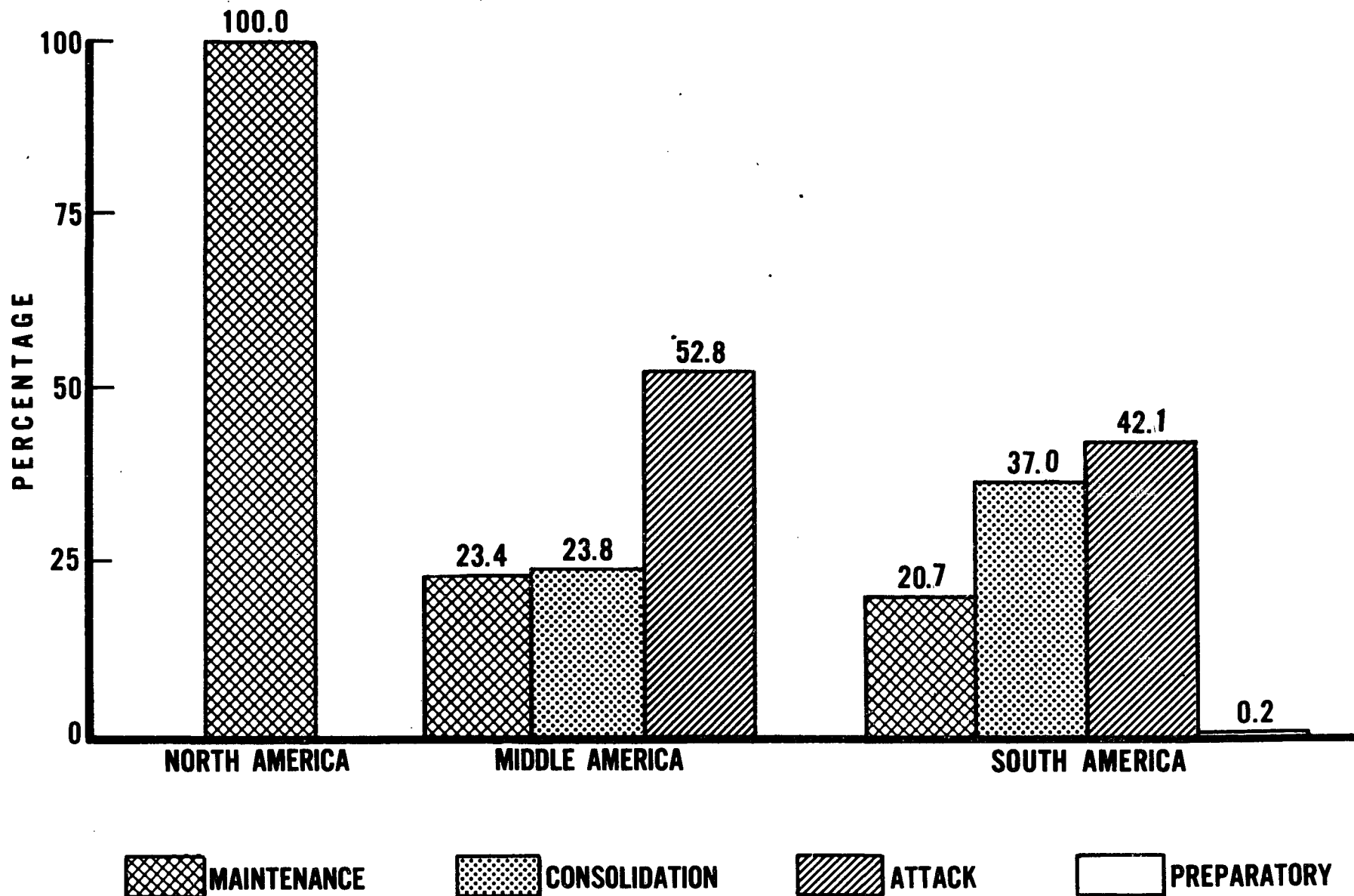
STATUS OF THE MALARIA ERADICATION PROGRAM IN THE AMERICAS, 31 DECEMBER 1971



STATUS OF THE MALARIA ERADICATION PROGRAM IN THE AMERICAS, 31 DECEMBER 1972

# STATUS OF MALARIA ERADICATION IN THE AMERICAS, BY REGION, 1972

## POPULATION BY PHASE AS A PERCENTAGE OF ORIGINALLY MALARIOUS AREA



# B. Current extent of the problem

Table 2 gives general information about the number of blood slides examined and the number of cases detected in the Americas from 1958 to 1972.

Table 2

## SUMMARY OF CASE DETECTION IN THE AMERICAS, 1958-1972

Year	Number of slides examined	Number of slides found positive
1958	1 716 103	56 705
1959	2 749 117	75 612
1960	3 955 149	79 998
1961	5 341 004	99 539
1962	7 221 367	177 089
1963	7 903 156	227 026
1964	8 156 290	254 572
1965	9 069 950	241 462
1966	11 731 451	333 245
1967	11 609 226	369 341
1968	12 522 696	282 773
1969	12 179 190	323 782
1970	9 925 187	344 027
1971	10 133 524	338 296
1972	9 671 730	277 912

In 1972, a total of 9,671,730 blood slides was examined among 190,448 inhabitants living in the malarious areas. This represents an annual blood examination rate (ABER) of 5.1 per cent. There was a general reduction in the number of malaria cases, from 338,296 in 1971 to 277,912 in 1972. It must be mentioned that of the 22 active programs in the Region, eight produced fewer than 360 cases in 1972, within their respective territories; these are: Argentina, Belize, Canal Zone, Costa Rica, Dominican Republic, French Guiana, Guyana and Paraguay. Table 3 shows the number and distribution of slides examined and the number of positives detected in each country by program phase.

Table 3

## CASE DETECTION BY COUNTRY AND PHASE OF PROGRAM, 1972

Country or other political or adminis- trative unit	Total		Maintenance phase		Consolidation phase		Attack 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 .....	99 806	359	53 383	140	46 423	219	-	-	-	-
Bolivia .....	132 750	4 275	-	-	23 209	561	109 409	3 695	132	19
Brazil .....	2 291 682	85 325	64 911	292	703 757	1 420	1 469 357	81 580	53 657	2 033
Colombia .....	646 399	30 997	-	-	339 367	4 073	302 892	26 690	4 140	234
Costa Rica .....	191 152	159	-	-	48 730	34	142 163	107	259	18
Cuba .....	511 753	34	358 105	1	-	-	-	-	153 648	33
Dominican Republic .....	392 394	261	298 858	79	45 964	-	47 500	182	72	-
Ecuador .....	321 611	6 709	-	-	107 264	483	214 347	6 226	-	-
El Salvador .....	394 935	38 335	-	-	-	-	370 926	37 659	24 009	676
Guatemala .....	345 156	7 750	-	-	-	-	340 395	7 592	4 761	158
Guyana .....	59 931	266	8 299	3	51 632	263	-	-	-	-
Haiti .....	289 145	19 060	-	-	-	-	289 145	19 060	-	-
Honduras .....	226 579	18 651	-	-	20 376	270	205 469	18 348	734	33
Jamaica .....	29 028	1	29 028	1	-	-	-	-	-	-
Mexico .....	2 329 667	26 216	-	-	500 179	679	1 801 975	25 294	27 513	243
Nicaragua .....	208 232	9 595	-	-	-	-	208 232	9 595	-	-
Panama .....	269 098	819	-	-	-	-	269 098	819	-	-
Paraguay .....	185 659	94	-	-	-	-	184 733	94	926	-
Peru .....	341 084	9 270	55 708	29	140 696	5 507	144 679	3 733	1	1
Trinidad and Tobago ...	15 345	2	15 345	2	-	-	-	-	-	-
United States .....	358	546	358	546	-	-	-	-	-	-
Venezuela .....	262 955	18 062	150 343	4 525	-	-	110 308	12 912	2 304	624
Belize .....	19 835	86	-	-	3 244	2	16 591	84	-	-
Canal Zone .....	38 896	41	-	-	38 896	41	-	-	-	-
Dominica .....	30	-	30	-	-	-	-	-	-	-
French Guiana .....	7 597	192	4 908	100	915	69	1 774	23	-	-
Grenada and Carriacou ..	1 026	1	1 026	1	-	-	-	-	-	-
Guadeloupe .....	...	...	...	...	-	-	-	-	-	-
Puerto Rico .....	...	5	...	5	-	-	-	-	-	-
St. Lucia .....	27	1	27	1	-	-	-	-	-	-
Surinam .....	59 600	800	10 249	1	20 340	84	28 444	702	567	13
Total .....	9 671 730	277 912	1 050 578	5 726	2 090 992	13 705	6 257 437	254 396	272 723	4 085

There was an increase in the population of areas in the maintenance phase from 43.8 per cent in 1971 to 45.5 per cent in 1972, in relation to the total population of originally malarious areas. This increase was attributed to the phase transfer of areas, from consolidation to maintenance in Brazil and Argentina. In the latter country, the last area in attack phase was transferred to the consolidation phase as well. No other significant change in program phase was recorded in other countries.

Within the maintenance phase area, which includes 20 political units (12 in total and 8 partially) with 86,634,000 inhabitants, 5,726 cases of malaria were found among 1,050,578 slides examined. Of which 79.0 per cent were in Venezuela, 9.5 per cent in the United States of America and 11.5 per cent in another 13 political units. Only 510 cases were classified as autochthonous: 391 in Venezuela, 95 in Argentina, 11 in French Guiana, 7 in Brazil and 3 cases each in Peru and the Dominican Republic. The number, species and classification of cases by country are shown in Table 4.

In the area in consolidation phase, 2,090,992 slides were examined among 42,016,000 inhabitants, giving an annual blood examination rate (ABER) of 5.0 per cent. A total of 13,705 malaria cases was found, representing an annual parasite incidence (API) of 0.3 per 1,000 inhabitants. If only those cases resulting from local transmission are taken into account, that is, 4,146 cases classified as autochthonous, 108 as introduced, and 2,825 cases which are believed to have resulted from local transmission among the 5,470 non-investigated (7,079 cases in all), the API would be 0.2 per 1,000 inhabitants. In general the API was within the acceptable range for this phase; however, in Colombia and in Peru, the number of cases was in excess of what would normally correspond to a consolidation phase area. Table 5 details the classification of cases and the species of parasite by country.

The attack phase area has a population of 61,645,000 inhabitants distributed in 19 political units. During the year, 6,257,437 slides were examined of which 254,396 cases were found to be positive, giving an ABER of 10.2 per cent and an API of 4.1 cases per 1,000 inhabitants. In comparison with the situation in 1971, there was a reduction in API from 5.2 to 4.1 cases per 1,000 inhabitants. In Table 6, the number of slides examined and cases by parasite species are shown by country.

In the non-malarious area, 272,723 slides were examined and 4,085 malaria cases found. The majority of these cases were imported from areas in the attack phase, but some were from areas in consolidation or from abroad. Table 7 gives the details of slides examined, cases found, classification of cases and species of parasite, by country.

The malaria mortality registered for the period from 1968 to 1972 is shown in Table 8, by country. The data presented in the table are based on information obtained from the statistical office of the Ministry of Health in the respective countries. As can be seen, the information is not complete for every year; in some countries, no information is available on this subject. Almost none of the malaria deaths were confirmed by laboratory diagnosis.

Table 9 contains the provisional classification of malaria eradication programs according to their prospects of achieving eradication, based on the progress made in 1972 and the conditions prevalent in the programs at the end of the year. In this table it is observed that of the 190,448,000 inhabitants residing in the originally malarious area, 86,634,000 are in the area in which eradication has already been achieved (45.5 per cent); 79,835,000 (41.0 per cent) are in areas in which the prospects of achieving eradication are good, and 23,979,000 (12.6 per cent) are in areas in which satisfactory progress has not been made.

Table 4

EPIDEMIOLOGICAL EVALUATION IN AREAS UNDER MAINTENANCE PHASE IN MALARIA  
ERADICATION PROGRAMS, 1972

Country or other political or adminis- trative unit	Number of slides examined	Total No. of positive cases	Species of parasite				Origin of infections							
			<u>P. faldi-</u> <u>parum</u>	<u>P. vivax</u>	<u>P. malar-</u> <u>iae</u>	Mixed infections	Autoch- thonous	Relapsing	Imported		Induced	Intro- duced	Cryptic and Unclassi- fied	Not investi- gated
									from abroad	from areas within country				
Argentina .....	53 383	140	-	140	-	-	95	6	2	5	-	25	6	1
Brazil .....	64 911	292	92	200	-	-	7	1	-	221	1	1	61	-
Cuba .....	358 105	1	-	1	-	-	-	-	-	1	-	-	-	-
Dominican Republic ....	298 858	79	79	-	-	-	3	4	70	-	-	2	-	-
Guyana .....	8 299	3	2	1	-	-	-	-	2	-	-	-	-	1
Jamaica .....	29 028	1	-	1	-	-	-	-	1	-	-	-	-	-
Peru .....	55 708	29	2	26	1	-	3	1	1	16	2	3	1	2
Trinidad and Tobago ....	15 345	2	-	1	1	-	-	-	1	-	-	-	1	-
United States of America .....	358 <sup>a)</sup>	546 <sup>b)</sup>	57	425	12	9	-	-	541	-	4	-	1	-
Venezuela .....	150 343	4 525	1 652	2 822	3	48	391	4	84	3 520	3	523	-	-
Dominica .....	30	0	-	-	-	-	-	-	-	-	-	-	-	-
French Guiana .....	4 908	100	94	6	-	-	11	-	2	41	-	-	6	40
Grenada and Carriacou..	1 026	1	-	-	1	-	-	-	1	-	-	-	-	-
Puerto Rico .....	...	5	1	4	-	-	-	-	5	-	-	-	-	-
St. Lucia .....	27	1	-	-	1	-	-	-	-	-	1	-	-	-
Surinam .....	10 249	1	1	-	-	-	-	-	-	1	-	-	-	-
Total	1 050 578	5 726	1 980	3 627	19	57	510	16	710	3 805	11	554	76	44

a) Slides examined at CDC. b) Includes 7 cases P. ovale; 4 without species diagnosed and no information on 32 cases.



Table 5

**EPIDEMIOLOGICAL EVALUATION IN AREAS IN CONSOLIDATION PHASE IN MALARIA  
ERADICATION PROGRAMS, 1972**

Country or other political or adminis- trative unit	Population (thousands)	No. of slides examined	Total No. of positive cases	IPA Total (a)	IPA Local (b)	Species of parasite				Origin of infections							
						<u>P.falci- parum</u>	<u>P.vivax</u>	<u>P.malar- iae</u>	Mixed in- fections	Au- tochtho- nous	Relaps- ing	Imported		In- duced	Intro- duced	Cryptic	Unclassi- fied or not investi- gated
						from abroad	from areas within country										
Argentina .....	1 102	46 423	219	0.2	0.1	-	219	-	-	100	5	33	-	-	2	25	54
Bolivia .....	999	23 209	561	0.6	0.3	-	561	-	-	71	-	-	69	-	-	1	420
Brazil .....	14 017	703 757	1 420	0.1	0.03	612	807	1	-	296	3	2	698	8	5	-	408
Colombia .....	8 926	339 367	4 073	0.5	0.1	1 862	2 152	-	59	946	8	43	2 296	7	4	102	667
Costa Rica .....	188	48 730	34	0.2	0.1	1	33	-	-	23	-	7	-	-	-	-	4
Dominican Republic ....	310	45 964	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ecuador .....	1 520	107 264	483	0.3	0.1	15	466	1	1	113	1	-	152	-	12	-	205
Guyana .....	46	51 632	263	5.7	5.2	145	118	-	-	230	-	23	-	-	10	-	-
Honduras .....	451	20 376	270	0.6	0.2	64	205	-	1	40	28	2	46	-	-	-	154
Mexico .....	11 866	500 179	679	0.1	0.03	2	671	6	-	330	117	1	183	8	4	10	26
Perú .....	2 427	140 696	5 507	2.3	2.2	-	5 506	1	-	1 939	50	-	14	-	-	-	3 504
Belize .....	53	3 244	2	0.04	-	-	2	-	-	-	-	-	1	-	-	1	-
Canal Zone .....	50	38 896	41	0.8	0.1	32	9	-	-	6	7	28	-	-	-	-	-
French Guiana .....	19	915	69	3.6	3.6	63	6	-	-	50	-	-	-	-	-	-	19
Surinam .....	42	20 340	84	2.0	1.7	84	-	-	-	2	-	-	2	-	71	-	9
Total .....	42 016	2 090 992	13 705	0.3	0.2	2 880	10 755	9	61	4 146	219	139	3 461	23	108	139	5 470

a) Estimated on the total number of cases found in the area, by 1,000 inhabitants. b) Estimated on the classified autochthonous, introduced, and estimated number of autochthonous among the non-investigated cases, by 1,000 inhabitants.

Table 6

EPIDEMIOLOGICAL EVALUATION OPERATIONS IN AREAS  
IN ATTACK PHASE, 1972

Country or other political or adminis- trative unit	Slides examined			Species found			
	Total	Positive		<u>P. falci-</u> <u>parum</u>	<u>P. vivax</u>	<u>P. malariae</u>	Mixed infections
		Number	Percentage				
Bolivia .....	109 409	3 695	3.4	356	3 331	-	8
Brazil .....	1 469 357	81 580	5.6	49 342	31 693	58	487
Colombia .....	302 892	26 690	8.8	15 688	10 820	6	176
Costa Rica .....	142 163	107	0.1	-	107	-	-
Dominican Republic ...	47 500	182	0.4	182	-	-	-
Ecuador .....	214 347	6 226	2.9	693	5 515	-	18
El Salvador .....	370 926	37 659	10.2	2 931	34 648	-	80
Guatemala .....	340 395	7 592	2.2	4	7 588	-	-
Haiti .....	289 145	19 060	6.6	19 060	-	-	-
Honduras .....	205 469	18 348	8.9	546	17 761	-	41
Mexico .....	1 801 975	25 294	1.4	837	24 438	9	10
Nicaragua .....	208 232	9 595	4.6	652	8 929	-	14
Panama .....	269 098	819	0.3	541	276	-	2
Paraguay .....	184 733	94	0.1	10	83	-	1
Peru .....	144 679	3 733	2.6	3	3 703	27	-
Venezuela .....	110 308	12 913	11.7	4 505	8 297	3	108
Belize .....	16 591	84	0.5	-	84	-	-
French Guiana .....	1 774	23	1.3	21	2	-	-
Surinam .....	28 444	702	2.5	653	46	-	3
Total .....	6 257 437	254 396	4.1	96 024	157 321	103	948

Table 7

EPIDEMIOLOGICAL EVALUATION OPERATIONS IN  
NON-MALARIOUS AREAS, 1972

Country or other political or adminis- trative unit	Slides examined			Species found			
	Total	Positive		<u>P. faldi-</u> <u>parum</u>	<u>P. vivax</u>	<u>P. malariae</u>	Mixed infections
		Number	Percentage				
Bolivia .....	132	19	14.9	-	19	-	-
Brazil .....	53 657	2 033	3.8	871	1 145	1	16
Colombia .....	4 140	234	5.7	100	132	-	2
Costa Rica .....	259	18	6.9	-	18	-	-
Cuba .....	153 648	33	0.0	11	22	-	-
Dominican Republic ...	72	0	-	-	-	-	-
El Salvador .....	24 009	676	2.8	48	628	-	-
Guatemala .....	4 761	158	3.3	-	158	-	-
Honduras .....	734	33	4.5	-	33	-	-
Mexico .....	27 513	243	0.9	2	215	25	1
Paraguay .....	926	0	-	-	-	-	-
Peru .....	1	1	100.0	-	1	-	-
Venezuela .....	2 304	624	27.1	116	489	1	18
Surinam .....	567	13	2.3	12	-	-	1
Total .....	272 723	4 085	1.5	1 160	2 860	27	38

Table 8

## REGISTERED DEATHS FROM MALARIA BY YEAR, 1968-1972

Country or other political or adminis- trative unit	Number of deaths from malaria					Malaria deaths as a % of all deaths					Malaria deaths per 100,000 inhabitants				
	1968	1969	1970	1971	1972	1968	1969	1970	1971	1972	1968	1969	1970	1971	1972
Argentina .....	9	-	1	-	-	0.00	-	0.00	-	-	0.0	-	0.0	-	-
Bolivia .....	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Brazil .....	85 <sup>a)</sup>	40 <sup>b)</sup>	74 <sup>a)</sup>	80 <sup>c)</sup>	19 <sup>d)</sup>	0.09 <sup>a)</sup>	0.04 <sup>b)</sup>	0.08 <sup>a)</sup>	0.09 <sup>c)</sup>	0.04 <sup>d)</sup>	1.0 <sup>a)</sup>	0.4 <sup>b)</sup>	0.8 <sup>a)</sup>	1.0 <sup>c)</sup>	0.4 <sup>d)</sup>
Canada .....	1	0	1	0	...	0.00	-	0.00	-	...	0.0	-	0.0	-	...
Colombia .....	1090	930	604	698	...	0.60	0.51	0.45	0.48	-	5.1	3.9	2.9	3.2	-
Costa Rica .....	2	2	1	3	...	0.02	0.02	0.01	0.03	-	0.1	0.1	0.1	0.2	...
Dominican Republic .....	5	2	3	2	0	0.02	0.01	0.01	0	-	0.1	0.1	0.1	0.0	-
Ecuador .....	150	154	97	93	...	0.24	0.24	1.16	0.15	...	2.6	2.6	1.6	1.5	...
El Salvador .....	206	186	122	92	...	0.69	0.55	0.35	1.39	-	6.3	5.4	3.5	2.6	...
Guatemala .....	25	19	20	...	...	0.03	0.02	0.03	...	...	0.5	0.4	0.4	...	...
Guyana .....	0	0	0	0	0	-	-	-	-	-	-	-	-	-	-
Haiti .....	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Honduras .....	129	109	65	58	...	0.63	0.49	0.32	0.28	-	5.3	4.4	2.6	2.2	-
Jamaica .....	0	0	1	...	...	-	-	...	...	...	-	-	0.1	...	...
Mexico .....	29	35	33	38	...	0.01	0.01	0.01	0.01	...	0.1	0.1	0.1	0.1	-
Nicaragua .....	340	270	254	...	...	2.26	1.69	1.64	...	...	18.5	14.1	12.6	...	...
Panama .....	21	24	16	9	8	0.22	0.25	0.16	0.09	0.09	1.6	1.7	1.1	0.6	0.5
Paraguay .....	18	15	2	4	0	1.14	0.13	0.02	0.03	-	1.6	1.3	0.2	0.3	-
Peru .....	54	38	43	...	...	0.05	0.04	0.04	-	-	0.4	0.3	0.3	-	-
United States of America ..	7	11	...	...	...	0.00	0.00	...	...	...	0.0	0.0	...	...	...
Venezuela .....	3	3	8	15	17	0.00	0.01	0.01	0.02	0.02	0.0	0.0	0.1	0.1	0.2
Belize .....	0	0	0	0	0	-	-	-	-	-	-	-	-	-	-
French Guiana .....	0	0	1	1	...	-	-	0.28	0.24	...	-	-	2.0	2.0	...
Puerto Rico .....	...	1	0	2	...	...	0.01	-	0.01	...	...	0.0	-	0.1	...
Surinam .....	1	...	...	1	0	0.04	...	...	0.04	-	0.3	...	...	0.3	-

a) Data from 19 of the 27 Capital cities.

b) Data from 18 of the 27 Capital cities.

c) Data from 17 of the 27 Capital cities.

d) Data from 7 of the 27 Capital cities.

Table 9

TENTATIVE CLASSIFICATION OF THE MALARIA ERADICATION PROGRAMS IN RELATION TO PROSPECT OF  
ERADICATION AND COUNTRIES OR TERRITORIES WHERE ERADICATION HAS ALREADY BEEN ACHIEVED, 1972

(Population in thousands)

Country or other political or adminis- trative unit	Eradication achieved	Good prospect of eradication			Not making satisfactory progress		
		Early eradica- tion quite sure	Early eradica- tion, if current progress con- tinues	Some adminis- trative and/or operational problems, but making progress	Progress de- pendent upon receiving funds	Serious admin- istrative and/or operational problems	Progress de- pendent upon funds and new attack measures to solve tech. problems
Argentina .....	1 859	1 102	-	-	-	-	-
Bolivia .....	-	-	999	-	678	-	-
Brazil .....	4 265	14 017	13 959	-	-	8 429	-
Chile .....	172	-	-	-	-	-	-
Colombia .....	-	8 926	1 539	2 029	-	153	577
Costa Rica .....	-	588	-	-	-	-	-
Cuba .....	3 058	-	-	-	-	-	-
Dominican Republic ....	3 924	310	107	-	-	-	-
Ecuador .....	-	1 520	-	2 124	-	-	-
El Salvador .....	-	-	-	335	2 375	-	501
Guatemala .....	-	-	674	1 181	232	-	-
Guyana .....	711	46	-	-	-	-	-
Haiti .....	-	-	-	-	-	3 666	84
Honduras .....	-	451	166	197	1 501	-	-
Jamaica .....	1 529	-	-	-	-	-	-
Mexico .....	-	11 866	-	9 457	-	-	4 229
Nicaragua .....	-	-	80	1 325	560	-	-
Panama .....	-	-	1 466	-	-	-	-
Paraguay .....	-	1 941	-	-	-	-	-
Peru .....	1 380	2 427	-	764	-	464	-
Trinidad and Tobago ....	816	-	-	-	-	-	-
United States .....	57 695	-	-	-	-	-	-
Venezuela .....	7 701	-	-	-	-	-	488
Belize .....	-	128	-	-	-	-	-
Canal Zone .....	-	50	-	-	-	-	-
Dominica .....	14	-	-	-	-	-	-
French Guiana .....	25	19	-	-	-	6	-
Grenada .....	37	-	-	-	-	-	-
Guadeloupe .....	295	-	-	-	-	-	-
Martinique .....	211	-	-	-	-	-	-
Puerto Rico .....	2 598	-	-	-	-	-	-
St. Lucia .....	96	-	-	-	-	-	-
Surinam .....	180	42	-	-	-	36	-
Virgin Islands (U.S.)	68	-	-	-	-	-	-
Total .....	86 634	43 433	18 990	17 412	5 346	12 754	5 879
% .....	45.5	22.8	10.0	9.1	2.8	6.7	3.1

In the 12 political units which have achieved malaria eradication throughout their entire territories, vigilance activities are carried out by the general services. In the remaining 22 units, although eight of them have part of their territories in the maintenance phase, active malaria eradication programs are being continued. Table 10 shows the distribution of population in these 22 units according to the categories established in the report presented by the Director-General of WHO at the Twenty-second World Health Assembly.

Table 10

**DISTRIBUTION OF THE POPULATION OF THE MALARIOUS AREA OF  
COUNTRIES WITH ACTIVE PROGRAMS AT DECEMBER 1972, IN RELATION  
TO PROSPECTS FOR ERADICATION**

Category	Population (in thousands)	
	Total	%
Eradication achieved in part of the country or territory .....	20 045	16.2
Early eradication quite sure .....	43 433	35.1
Early eradication if current progress continues .....	18 990	15.3
Operational or administrative problems but progress being made .....	17 412	14.1
Progress dependent upon receiving funds .....	5 346	4.3
Serious administrative and operational problems .....	12 754	10.3
Progress dependent upon financial support and new attack measures to solve serious technical problems .....	5 879	4.7
Total .....	123 859	100.0

Tables 11 and 12 contain detailed figures of population and areas in the Americas by program phase and political or administrative unit.

Graph No. 2 shows the distribution of population in the originally malarious areas by program phase. In addition, from page 40 to page 124, statistical information on the current situation and the evolution of the campaign is given country-by-country. Finally, to supplement the statistical data, a brief narrative report for each program is given in the following paragraphs.

Table 11

**STATUS OF MALARIA ERADICATION IN THE AMERICAS, BY POPULATION, 1972**  
(Population in thousands)

Country or other political or administrative 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 .....	23 893	2 961	11.3	1 859	62.8	1 102	37.2	-	-	-	-
Barbados .....	241 <sup>a)</sup>	-	-	-	-	-	-	-	-	-	-
Bolivia .....	5 208	1 677	32.2	-	-	999	59.6	678	40.4	-	-
Brazil .....	100 254	40 670	40.6	4 265	10.5	14 017	34.5	22 388	55.0	-	-
Canada .....	21 824 <sup>a)</sup>	-	-	-	-	-	-	-	-	-	-
Chile .....	10 100 <sup>a)</sup>	172 <sup>b)</sup>	1.7	172	100.0	-	-	-	-	-	-
Colombia .....	22 491	13 224	58.8	-	-	8 926	67.5	4 145	31.3	153	1.2
Costa Rica .....	1 836	588	32.0	-	-	188	32.0	400	68.0	-	-
Cuba .....	8 722 <sup>c)</sup>	3 058	35.1	3 058	100.0	-	-	-	-	-	-
Dominican Republic ....	4 371	4 341	99.3	3 924	90.4	310	7.1	107	2.5	-	-
Ecuador .....	6 493	3 644	56.1	-	-	1 520	41.7	2 124	58.3	-	-
El Salvador .....	3 772	3 211	85.1	-	-	-	-	3 211	100.0	-	-
Guatemala .....	5 604	2 087	37.2	-	-	-	-	2 087	100.0	-	-
Guyana .....	757	757	100.0	711	93.9	46	6.1	-	-	-	-
Haiti .....	5 090	3 750	73.7	-	-	-	-	3 750	100.0	-	-
Honduras .....	2 653	2 315	87.3	-	-	451	19.5	1 864	80.5	-	-
Jamaica .....	1 911 <sup>c)</sup>	1 529	80.0	1 529 <sup>d)</sup>	100.0	-	-	-	-	-	-
Mexico .....	50 982	25 552	50.1	-	-	11 866	46.4	13 686	53.6	-	-
Nicaragua .....	1 965	1 965	100.0	-	-	-	-	1 965	100.0	-	-
Panama .....	1 523	1 466	96.3	-	-	-	-	1 466	100.0	-	-
Paraguay .....	2 329 <sup>e)</sup>	1 941	83.3	-	-	-	-	1 941	100.0	-	-
Peru .....	14 442	5 035	34.9	1 380	27.4	2 427	48.2	1 228	24.4	-	-
Trinidad and Tobago ...	1 033	816	79.0	816 <sup>d)</sup>	100.0	-	-	-	-	-	-
United States of America	208 232 <sup>a)</sup>	57 695	27.7	57 695 <sup>d)</sup>	100.0	-	-	-	-	-	-
Uruguay .....	2 956 <sup>a)</sup>	-	-	-	-	-	-	-	-	-	-
Venezuela .....	10 919	8 189	75.1	7 701 <sup>f)</sup>	94.0	-	-	488	6.0	-	-
Antigua .....	74 <sup>a)</sup>	-	-	-	-	-	-	-	-	-	-
Bahamas .....	189 <sup>a)</sup>	-	-	-	-	-	-	-	-	-	-
Bermuda .....	55 <sup>a)</sup>	-	-	-	-	-	-	-	-	-	-
Belize .....	128	128	100.0	-	-	53	41.4	75	58.6	-	-
Canal Zone .....	50	50	100.0	-	-	50	100.0	-	-	-	-
Dominica .....	70	14	20.0	14 <sup>d)</sup>	100.0	-	-	-	-	-	-
Falkland Island .....	2	-	-	-	-	-	-	-	-	-	-
French Guiana .....	50	50	100.0	25	50.0	19	38.0	6	12.0	-	-
Grenada and Carriacou ..	98	37 <sup>b)</sup>	37.8	37 <sup>d)</sup>	100.0	-	-	-	-	-	-
Guadeloupe .....	337 <sup>a)</sup>	295 <sup>b)</sup>	87.5	295	100.0	-	-	-	-	-	-
Martinique .....	340	211 <sup>b)</sup>	62.1	211	100.0	-	-	-	-	-	-
Montserrat .....	12 <sup>a)</sup>	-	-	-	-	-	-	-	-	-	-
Netherland Antilles ....	229 <sup>a)</sup>	-	-	-	-	-	-	-	-	-	-
Puerto Rico .....	2 797	2 598 <sup>b)</sup>	92.9	2 598 <sup>d)</sup>	100.0	-	-	-	-	-	-
St. Kitts, Nevis, Anguilla	66 <sup>a)</sup>	-	-	-	-	-	-	-	-	-	-
St. Lucia .....	101	96	95.0	96 <sup>d)</sup>	100.0	-	-	-	-	-	-
St. Pierre and Miquelon	5 <sup>a)</sup>	-	-	-	-	-	-	-	-	-	-
St. Vincent .....	91	-	-	-	-	-	-	-	-	-	-
Surinam .....	400	258	64.5	180	69.8	42	16.3	36	14.0	-	-
Virgin Islands ( U.K. ) ..	11 <sup>a)</sup>	-	-	-	-	-	-	-	-	-	-
Virgin Islands ( U.S.A. )	68 <sup>a)</sup>	68	100.0	68 <sup>d)</sup>	100.0	-	-	-	-	-	-
<b>Total .....</b>	<b>524 774</b>	<b>190 448</b>	<b>36.3</b>	<b>86 634</b>	<b>45.5</b>	<b>42 016</b>	<b>22.0</b>	<b>61 645</b>	<b>32.4</b>	<b>153</b>	<b>0.1</b>

a) PAHO mid-year estimates. b) Estimated. c) Figure as of December 1971 provided by country. d) Population in areas where eradication of malaria has been certified by PAHO/WHO. e) The decrease is due to a 1972 Census. f) Includes an area with 5 773 173 inhabitants where eradication of malaria has been certified by PAHO/WHO.

Table 12

## STATUS OF MALARIA ERADICATION IN THE AMERICAS, BY AREA, 1972

(Area in Km<sup>2</sup>)

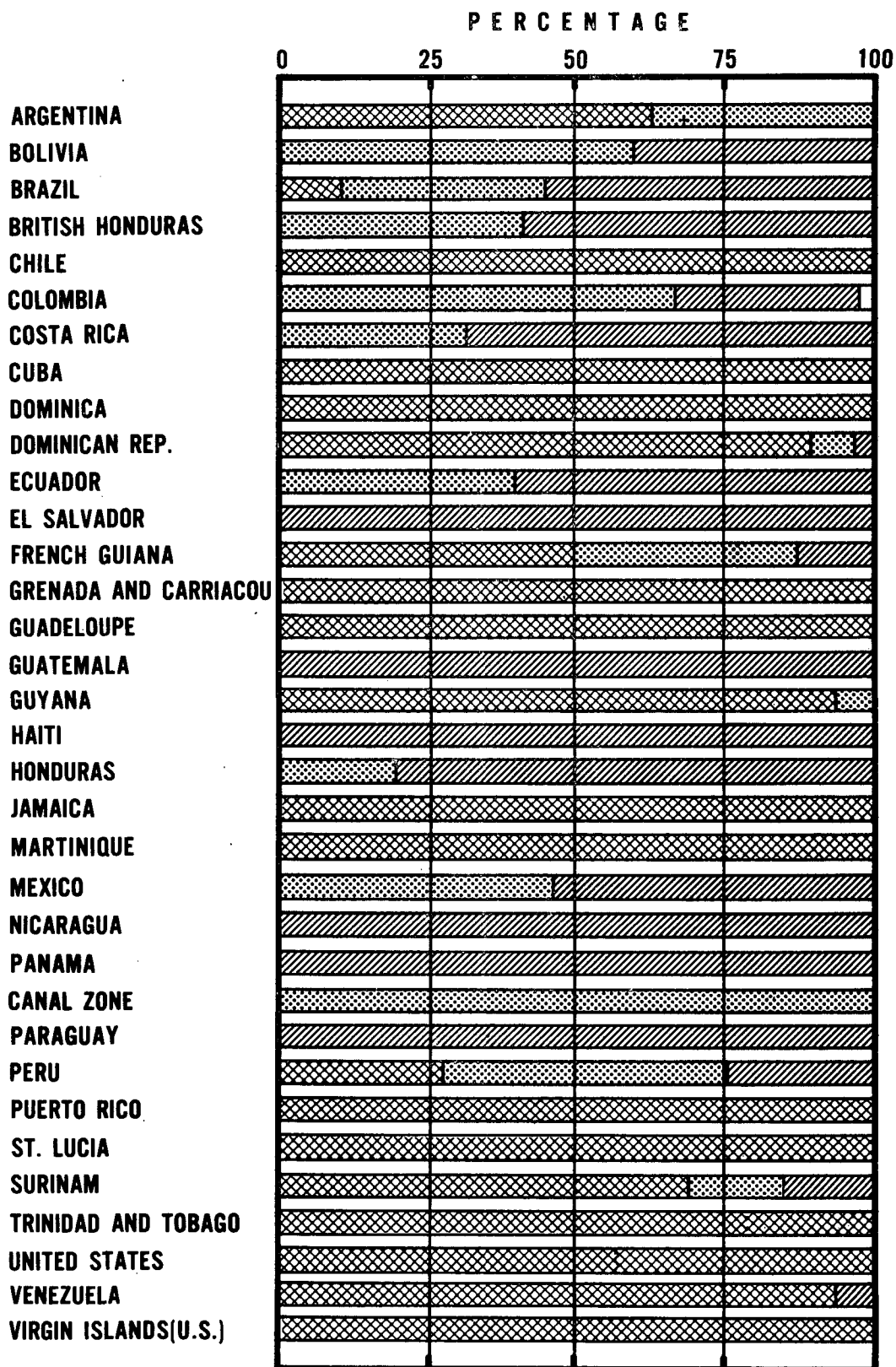
Country or other political or administrative unit	Total area	Originally malarious areas									
		Total		Malaria eradication claimed (maintenance phase)		Consolidation phase		Attack phase		Prep. phase or program not yet started	
		Total	%	Total	%	Total	%	Total	%	Total	%
Argentina .....	4 024 458	349 051	8.7	133 661	38.3	215 390	61.7	-	-	-	-
Barbados .....	430	-	-	-	-	-	-	-	-	-	-
Bolivia .....	1 098 581	821 346 <sup>a)</sup>	74.8	-	-	367 940	44.8	453 406	55.2	-	-
Brazil .....	8 511 965	6 912 234 <sup>a)</sup>	81.2	82 402	1.2	179 025	2.6	6 650 807	96.2	-	-
Canada .....	9 221 016	-	-	-	-	-	-	-	-	-	-
Chile .....	741 767	55 287	7.5	55 287	100.0	-	-	-	-	-	-
Colombia .....	1 138 914	970 849	85.2	-	-	113 176	11.7	808 651	83.3	49 022	5.0
Costa Rica .....	50 900	35 446	69.6	-	-	11 285	31.8	24 161	68.2	-	-
Cuba .....	114 524	37 502	32.7	37 502	100.0	-	-	-	-	-	-
Dominican Republic .....	48 442	47 562	98.2	38 035	80.0	6 490	13.6	3 037	6.4	-	-
Ecuador .....	291 906	175 462	60.1	-	-	27 797	15.8	147 665	84.2	-	-
El Salvador .....	21 149	18 655	88.2	-	-	-	-	18 655	100.0	-	-
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	-	-	7 123	7.0	94 228	93.0	-	-
Jamaica .....	11 428	10 028	87.7	10 028 <sup>b)</sup>	100.0	-	-	-	-	-	-
Mexico .....	1 967 183	1 150 000	58.5	-	-	424 694	36.9	725 306	63.1	-	-
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	100.0	-	-	-	-	406 552	100.0	-	-
Peru .....	1 285 215	961 171	74.8	195 818 <sup>b)</sup>	20.4	221 930	23.1	543 423	56.5	-	-
Trinidad and Tobago .....	5 605	5 444	97.1	5 444 <sup>b)</sup>	100.0	-	-	-	-	-	-
United States of America	9 359 781	2 309 601	24.7	2 309 601 <sup>b)</sup>	100.0	-	-	-	-	-	-
Uruguay .....	186 926	-	-	-	-	-	-	-	-	-	-
Venezuela .....	912 050	600 000	65.8	460 054 <sup>c)</sup>	76.7	-	-	139 946	23.3	-	-
Antigua .....	280	-	-	-	-	-	-	-	-	-	-
Bahamas .....	11 396	-	-	-	-	-	-	-	-	-	-
Bermuda .....	53	-	-	-	-	-	-	-	-	-	-
Belize .....	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 <sup>b)</sup>	100.0	-	-	-	-	-	-
Falkland Island .....	11 961	-	-	-	-	-	-	-	-	-	-
French Guiana .....	90 000	90 000	100.0	200	0.2	82 300	91.5	7 500	8.3	-	-
Grenada and Carriacou	342	103	30.1	103 <sup>b)</sup>	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 <sup>b)</sup>	100.0	-	-	-	-	-	-
St. Pierre and Miquelon	240	-	-	-	-	-	-	-	-	-	-
St. Vincent .....	389	-	-	-	-	-	-	-	-	-	-
Surinam .....	163 820	163 750	100.0	17 020	10.4	47 280	28.9	99 450	60.7	-	-
Virgin Islands (U.K.)...	174	-	-	-	-	-	-	-	-	-	-
Virgin Islands (U.S.A.)	344	344	100.0	344	100.0	-	-	-	-	-	-
Total .....	40 383 698	15 759 802	39.0	3 395 930	21.5	1 885 757	12.0	10 429 093	66.2	49 022	0.3

a) Reduction of area resulted from reclassification of malarious areas. b) Area where eradication of malaria has been certified by PAHO/WHO. c) Includes an area with 407 945 Km<sup>2</sup> where eradication of malaria has been certified by PAHO/WHO.



GRAPH 2

# **DISTRIBUTION OF POPULATION IN THE ORIGINALLY MALARIOUS AREAS OF THE AMERICAS BY PHASE OF THE PROGRAM, 1972**



MAINTENANCE
 CONSOLIDATION
 ATTACK
 PREPARATORY

## ARGENTINA

The last area in attack phase (with 80,000 inhabitants) was transferred to consolidation phase in July 1972, as no autochthonous cases had been found during the previous 18 months. With this change, the malarious area in the country consisted of a maintenance phase area with 1,859,000 inhabitants and a consolidation phase area with 1,102,000. During the year, 99,806 blood slides were examined and 359 cases found to be positive.

Most of the cases were located in the frontier region with Bolivia. Intensive efforts have been made to coordinate field activities along the border area with this country.

## BOLIVIA

The financial situation of the program was much improved in 1972; field activities were increased and the number of malaria cases was reduced from 8,080 in 1971 to 4,275 in 1972. The Government continued to give a high priority to the program and has already approved an adequate budget for 1973. Through border meetings with Argentina and Paraguay, a plan of coordinated field operations was agreed upon for border areas, which is being carried out since January 1973. As of December 1972, 999,000 inhabitants resided in areas in the consolidation phase and 678,000 in areas in the attack phase.

## BRAZIL

The reorganization of the malaria eradication service (CEM) was completed in February 1972. The malarious area was divided into two parts, one of eradication within a limited time period and the other, over a long-term. The former has an extension of 1,803,719 km<sup>2</sup> with 32,243,187 inhabitants and the latter, 8,511,965 km<sup>2</sup> with 8,427,159 inhabitants. In the construction of trans-Amazon highways, special attention and additional funds were given by the Government for the protection from malaria of workers and newly developed colonization areas along the highways. Effective 1 January 1972, 176 municipalities in the State of São Paulo, with 81,346 km<sup>2</sup> and 3,398,748 inhabitants were transferred from consolidation to maintenance phase and 16 municipalities with 32,377 km<sup>2</sup> and 148,910 inhabitants in the Sectors of Ceará, Pernambuco and Pirapora passed from attack to consolidation phase. In addition, it was recommended that in 52 municipalities and 23 cities in the Sectors of Sergipe, Alagoas, Piauí, Pirapora and the Federal District, spraying operations be suspended and epidemiological evaluation intensified. After a year, the area will be passed to consolidation phase if no evidence of transmission is proved during the year's observation period. At the end of 1972, 4,265,000 inhabitants were in areas in the maintenance phase, 14,017,000 in the consolidation phase and 22,388,000 in the attack phase. During the year, a total of 85,325 malaria cases was found in the country among 2,291,682 slides examined.

## COLOMBIA

The malaria eradication program works under the Division of Direct Campaigns (División de Campañas Directas) which includes immunization programs, control of eradication of yaws, *Aedes aegypti*, leprosy, the administration of maternal and child health posts and an anti-venereal disease campaign in rural areas. The objectives of the program in 1972 were: to maintain adequate surveillance in the area in consolidation phase with 8.9 million inhabitants (67.5 per cent of the total population of the malarious area); to interrupt malaria transmission in part of the areas in attack phase which responds well to residual insecticides with 3.6 million inhabitants (27.0 per cent of the total) and to reduce malaria incidence in the area with persistent malaria transmission with 370,000 inhabitants (5.5 per cent of the total). The number of malaria cases in the country showed an increase, from 22,402 cases in 1971 to 30,997 cases in 1972. The major increase was observed in the areas of agricultural colonization, especially in the Urabá region where *P. falciparum* was found to have increased its resistance to chloroquine in grade and extension, after mass drug administration in the area since March 1971. Two sectors of this area registered epidemics due to poor coverage with DDT. They have been controlled by the resumption of spraying and the use of alternative drugs.

## COSTA RICA

The program continued to make satisfactory progress towards eradication. The area in consolidation phase has 188,000 inhabitants or 32.0 per cent of the total population of the originally malarious area, and the area in attack phase, 400,000 inhabitants (68.0 per cent). Within the area in the attack phase, there is a small area with 10,896 inhabitants where the vector is resistant to DDT and where Propoxur was used in 1972. As a result, no malaria cases were reported from this area during the year. Taking the country as a whole, malaria transmission was further focalized and the number of cases reduced. Of the 159 cases registered, 62 were imported from neighbouring countries. The Government requested an evaluation of the program early in 1973 to review the program and to consider the possibility of transferring an area with 220,000 inhabitants from the attack phase to consolidation.

## DOMINICAN REPUBLIC

Of the 4,341,000 inhabitants in the malarious area, 90.4 per cent are in the maintenance phase area, 7.1 per cent in consolidation and 2.5 per cent in attack. The area in the attack phase extends along the border with Haiti. During the year, active foci were practically eliminated, but the area is very vulnerable and continued application of insecticides is needed. During 1972, a total of 182 cases was found in the border area, of which 119 were classified as imported. In the area in the maintenance phase, 74 cases were classified as imported of the 79 registered. The evaluators and supervisors in the area in maintenance phase participated actively in other health programs during their house-to-house visits. In 1972 such health activities covered 853,295 inhabitants or 35.0 per cent of the country's rural population.

## ECUADOR

The malarious area in the country has a population of 3,644,000, of which 41.7 per cent live in areas in the consolidation phase and the rest in areas in the attack phase. The program continued to apply DDT semi-annually in areas in the attack phase and maintained malaria surveillance in the consolidation phase areas. The program progressed well and the number of malaria cases was further reduced, from 9,171 cases in 1971 to 6,709 cases in 1972. However, in two provinces in the North (Esmeraldas and Napo), incidence has increased in the last two years because of exploitation of petroleum, the construction of an oil pipeline and expansion of banana cultivation, which have brought an immigration of workers and new settlers into the area.

## EL SALVADOR

The malarious area has a population of 3,210,646 inhabitants, all of which is considered to be in the attack phase. However, due to insufficient resources, 53.2 per cent of the land surface and 59.2 per cent of the population in the malarious area do not benefit from the attack measures. DDT was applied semi-annually in the area where the vector is still susceptible to this insecticide and Propoxur in the area where the vector is resistant to DDT. In three Departments on the eastern coast, houses were sprayed with Propoxur four times a year, while in the rest of the DDT-resistant area, Propoxur was applied every 35 days, using partial spraying techniques. In the area sprayed with DDT and in the area partially sprayed with Propoxur every 35 days, the situation remained about the same in relation to 1971. There are many factors responsible for the slow response of malaria to the attack measures applied. Among the known factors are: the existence of various degrees of DDT resistance in the DDT sprayed area, and Propoxur resistance in certain localities; poor spraying coverage in 1971 and early 1972, and the influence of surrounding areas without spraying. On the other hand, in the three Departments sprayed with Propoxur four times a year; the intensity of transmission was reduced considerably. In an indicator District in this zone, a reduction of the parasite rate from 3.1 per cent in 1971 to 0.5 per cent in 1972 was observed in two mass blood examinations carried out in the same period of the year. These three Departments form a geographical block where the vector is susceptible to Propoxur. In the entire country 38,335 cases were found, while in 1971 46,858 were registered.

## GUATEMALA

The country has a population of 2,087,000 inhabitants in the malarious area, all in the attack phase, of which 730,000 persons were directly protected by DDT house-spraying, 211,000 by Propoxur and 19,000 by DDT and mass drug administration. The rest of the population in the malarious area is under epidemiological surveillance without application of attack measures, although they are regarded as in the attack phase. The area sprayed with Propoxur showed a considerable reduction in the number of cases. In two indicator Districts, parasite rates were reduced from 1.7 per cent in 1971 to 0.1 per cent in 1972 in comparable mass blood examinations. The area sprayed with DDT also showed a considerable reduction in malaria incidence, but some outbreaks were observed in three areas of colonization. Considering the country as a whole, the number of malaria cases was reduced from 8,280 in 1971 to 7,750 in 1972.

## GUYANA

There are 757,000 inhabitants in the country, of which 710,600 are in the maintenance phase area and 46,400 in consolidation. In the maintenance phase area, three malaria cases were registered (2 imported and 1 cryptic). In the consolidation phase area 263 cases were found, and two foci of transmission were located from cases imported from neighbouring countries. For this reason, the NMES was obliged to continue the application of preventive spraying in border areas.

## HATTI

The malarious area consists of 560 rural sections with a total population of 3,750,000. In 276 of these sections with 1,763,700 inhabitants (47.0 per cent of the malarious area), less than five cases were found within the last four years (1969-1972), for which transmission is considered to be interrupted. Of the remaining 284 rural sections which produced more than six cases of malaria in the last four years, only 52 with 381,500 inhabitants are considered to have high potential for transmission, and the other 232 sections have a low to moderate transmission level. During the year, DDT house-spraying was applied twice with good coverage, but transmission was not interrupted. Among the known factors for persistent transmission are movement of population, white-washing of wall surfaces and certain level of vector resistance in some localities. In addition, during May-July a heavy rainfall was recorded on the southern coast which caused inundations of up to two meters in certain localities. Because of the high density of the vector and the effects of the floods, a serious epidemic of malaria occurred producing 8,943 laboratory confirmed cases in a population of 135,000 inhabitants up to the end of the year. In total, 19,060 positive cases were registered in the country during 1972, compared to 11,347 cases in 1971.

## HONDURAS

The country has a population of 2,314,524 in the malarious area, of which 450,874 live in the areas under consolidation and 1,863,650 in areas in the attack phase. In the latter, there is an area with 196,575 inhabitants where the vector is resistant to DDT but susceptible to Propoxur. This DDT resistant area contains only 8.5 per cent of the total population in the malarious area, but it had produced more than 75 per cent of all positive cases in the country until 1971. Propoxur has been in use in this area since April 1971 with very encouraging results; malaria incidence was reduced from 38,020 cases in 1971 to 8,832 cases in 1972. However, in the rest of the country where the vector is susceptible to DDT, the malaria situation remained practically the same as in 1971 because the program's budget only permitted DDT application in an area with 164,000 inhabitants (10 per cent of the area to be sprayed), leaving the remaining area without any attack measures. The country as a whole showed a reduction of malaria cases from 48,586 in 1971 to 18,651 in 1972.

## MEXICO

Field operations were intensified since early in 1971, and consequently the malaria situation in the country was much improved in 1972; and, a reduction in the number of malaria cases was observed in 13 of the 14 zones into which the malarious area of the country is divided. Only one zone maintained malaria incidence at its 1971 level because ME activities and resources had to be diverted to cope with an outbreak of equine encephalitis. During the year, 26,216 cases of malaria were found, while in 1971, 42,978 cases were registered. At the end of 1972, the malarious area had 25,552,000 inhabitants, of which 46.4 per cent were in areas in the consolidation phase and 53.6 per cent in the attack phase.

A strategy review took place during 15 May-2 July 1972 by a team composed of representatives from the Secretariat of Health and Welfare of the Government of Mexico and PAHO/WHO malariologists. Having studied the present status of the program, factors affecting it, and the results obtained since the initiation of the antimalarial campaign, the team recommended application of attack measures selected for each area and necessary research. Based on these recommendations, the Government prepared a new plan of operations for 1973-1975.

## NICARAGUA

This is the first country where Propoxur was applied on a large scale, in part of the area where the vector is resistant to DDT. The application of this new insecticide began in April 1970 with a coverage of 15,800 houses. In 1971 the coverage was increased to 76,000 houses, and again in 1972 to 93,000 houses. The results obtained are encouraging: in two indicator Districts the parasite rate fell from 2.6 per cent in 1971 to 0.5 per cent in 1972 in two comparable mass blood examinations. The entire country is considered in the attack phase, with a population of 1,965,000 inhabitants, of which 1,325,000 (67 per cent) live in the area where the vector is resistant to DDT. In 1971 there had been 25,303 cases registered in the country, while in 1972 only 9,595 cases were detected.

An earthquake hit the city of Managua on 23 December destroying buildings and houses in the downtown area where the National Malaria Eradication Service had its main office. Fortunately, the storehouse for insecticides, spraying equipment and drugs was located outside the affected area and, therefore, emergency operations could be carried out in the areas where temporary camps were erected to accommodate homeless refugees. The city is located within the malarious area and the receptivity in the suburbs is high.

## PANAMA

Good progress continued in 1972. At the beginning of the year, an outbreak of malaria was observed in a small locality with 1,000 inhabitants due to the appearance of DDT resistance in the vector, but it was completely eliminated. This outbreak was responsible for 320 of the 819 cases found during 1972. By the end of the year, of the seven foci previously registered, only two remained (Bocas del Toro and Darien) where transmission was still observed. A further reduction in the number of malaria cases was shown, from 1,041 in 1971 to 819 in 1972. The entire country is considered in the attack phase with a population of 1,466,000 inhabitants.

The Canal Zone is in the consolidation phase. In 1972 malaria surveillance activities were maintained, and 41 cases detected: 28 cases were imported, seven were relapses and six autochthonous.

## PARAGUAY

The entire malarious area was in the attack phase in 1972, with a population of 1,941,000. The program continued to make steady progress towards eradication. In 1972, only 94 malaria cases were found. Of these, 57 cases were imported from Brazil and seven were relapses. Malaria transmission has been practically interrupted throughout the country and *P.falciparum* has not been found since April 1972. Efforts are being made by the Government to extend other health services utilizing the personnel of the malaria service and voluntary collaborators. Through the network of the health services, vigilance activities will be maintained. A strategy review was conducted between 28 February and 10 March by a team of professionals from the National Planning Board, the Ministry of Health, the Ministry of Agriculture and the Ministry of Finance of the Government of Paraguay, as well as from PAHO/WHO, CDC/USPHS, AID and UNICEF. The team took note of the remarkable progress achieved since the initiation of the program and the high priority given it by the Government within the National Plan for Social and Economic Development. In view of the needs for future malaria vigilance and development of an infrastructure of health services, the team recommended the preparation of a plan to facilitate progressive integration of antimalarial activities into the general health services, utilizing the experience and resources of the National Malaria Eradication Service, including some voluntary collaborators. To attain such a goal, the team stressed the importance of training health personnel in malaria vigilance and malaria personnel in other health activities. During the year, the Government appointed a special commission to elaborate a plan for the extension of health services in rural areas.

## PERU

The malarious area of the country has 5,035,000 inhabitants, 27.4 per cent of which are in areas in maintenance phase, 48.2 per cent in consolidation and 24.4 per cent in the attack phase.

The malaria situation in the maintenance phase area showed much progress in eliminating existing foci of transmission. On the other hand, the situation in the consolidation phase area deteriorated with the appearance of foci, producing almost three times as many malaria cases as in 1971. In part of the area in the consolidation phase, there was an exceptional rainfall, causing flooding and destroying houses. As a consequence, there were increase of breeding places and appearance of precarious temporary houses. In addition, there has been an extensive development of rice cultivation in the last few years in the area, contributing to the breeding of vector species. In the attack phase area, the situation also deteriorated slightly. The country as a whole showed an increase in the number of malaria cases, from 4,128 in 1971 to 9,271 in 1972.

## VENEZUELA

The population in the malarious area totals 7,189,000 of which 7,701,000 (94.0 per cent) were in the maintenance phase and 488,000 in the attack phase. In 1972, attack measures included DDT house-spraying, distribution of chloroquine reserves to each individual family, radical cure treatment, peridomiliary insecticide fogging and mass drug administration every week in selected localities. As a result, the annual parasite incidence was reduced from 31.6 per 1,000 in 1971 to 19.2 in 1972, in the eastern malarious area with 407,418 inhabitants. In the southern malarious area the problem was further focalized, but in the foci yet active there was an increase in the annual parasite incidence from 82.2 per 1,000 inhabitants in 1971 to 113.8 in 1972, because of problems associated with human ecology that prevented good coverage with available attack measures. In the area under maintenance phase, vigilance activities were well maintained. Considering the country as a whole, the number of malaria cases was reduced from 23,506 in 1971 to 18,062 in 1972.

## BELIZE

The program continued its activities to prevent reintroduction of malaria transmission and to eliminate the residual foci. During the year a total of 86 cases was found, of which 72 cases were related to a focus which developed in August in a remote locality with 125 inhabitants, from an imported case. With the application of emergency measures, the focus was eliminated. The entire country is considered malarious, with 128,000 inhabitants; 53,000 live in areas in the consolidation phase and 75,000 in areas in the attack phase.

## FRENCH GUIANA

The program continued through the distribution of medicated salt and residual house-spraying in areas in the attack phase (6,000 inhabitants). In addition, emergency measures were applied in areas in the consolidation (19,000 inhabitants) and maintenance (25,000 inhabitants) phases. The distribution of medicated salt together with residual house-spraying kept malaria transmission at a low level in the attack phase area, but surveillance activities in consolidation and maintenance phase areas were not sufficient to eliminate existing foci of infection. During the year, 192 cases were identified: 23 in the attack phase area, 69 in the consolidation phase and 100 in the maintenance phase area.

## SURINAM

The malarious area has a population of 258,000 of which 180,000 persons live in areas in the maintenance phase, 42,000 under consolidation and 36,000 in the attack phase. Distribution of medicated salt continued to be the principal measure in the major part of the area under attack phase. During the year the production of medicated salt and the system for its transportation failed on certain occasions, due to administrative difficulties, and consequently, coverage was not adequate, especially on the Upper Surinam River. Despite the insufficient coverage, incidence was reduced considerably. During the year, an outbreak was observed in remote Amerindian villages, having produced 342 cases or 48.7 per cent of all malaria cases found in the country. This group

of population is closely related to similar groups of population in Brazil and has very little communication with the rest of Surinam. The *P. falciparum* strain found at this outbreak is resistant to chloroquine. Through the collaboration of missionary groups, emergency house-spraying was carried out and radical cure treatment were given. In the area in the consolidation phase, two residual foci were eliminated, but two new foci appeared. The latter have been brought under control by the application of emergency measures. Considering the country as a whole, the number of malaria cases and the slide positive rate reached their lowest point since the beginning of the program: 800 cases and 1.34 per cent slide positivity rate. In 1971, there had been 1,546 cases registered with a slide positivity rate of 3.0 per cent.

### C. Field Operations

Residual insecticides continued as the principle method for attacking malaria throughout the Region. The number of house-sprays totaled 17,705,420 in 1972; an increase of 11.7 per cent over 1971 (Table 13). DDT continued as the predominant insecticide and was utilized in spraying approximately 95 per cent of the houses. Approximately 1,000,000 house-sprays were made with Propoxur; a 50 per cent increase over 1971. In Colombia and Mexico, HCH continued to be used as a supplement to DDT in limited areas. Other attack measures employed during the year included the distribution of medicated salt in French Guiana and Surinam; larviciding in limited foci of the Dominican Republic, Guatemala, Haiti, Mexico and Nicaragua and presumptive chemotherapy in all programs. The amounts of insecticide consumed in 1971 and 1972 are summarized country-by-country in Table 14.

Though full operational activities increased in 1972, limitations in financial resources prevented the extension of Propoxur to all areas with vector resistance to DDT in Central America and in some countries, operations were handicapped because of the deterioration in vehicular equipment. As shown in Table 15, of 4,488 trucks, jeeps and automobiles in the Region, 1,922 have been classified as being in poor condition.

Despite such problems and increasing areas of vector resistance in El Salvador to both DDT and Propoxur, the number of cases of malaria in the Hemisphere declined from 338,296 in 1971 to 277,912 in 1972. As shown in Table 16, a total of 9,671,730 blood slides were collected through active and passive case detection. Passive case detection contributed 37.5 per cent of the blood slides and 70.0 per cent of the cases of malaria in the Region. Thus, its effectiveness in detecting transmission foci continues.

The number of persons employed in the eradication programs by country and category are shown in Tables 17 to 21. At the end of 1972 there were 31,348 full-time and 324 part-time employees in the nationally sponsored programs. The number represents a slight increase over 1971. Of the total personnel, over 54 per cent are assigned to field operations.

During the year there has been increasing interest by some countries in having the malaria service assume additional responsibilities in other public health activities. In some countries reinfested with *A. aegypti*, responsibility for eradication of this vector has been assigned to the malaria service and has been accompanied by increased financial resources. Though it is too early to evaluate the impact of the recent trend, needs for expanding the scope of training of malaria personnel in the epidemiology and control of other diseases are becoming increasingly evident.

Table 13

SUMMARY OF HOUSES SPRAYED WITH RESIDUAL INSECTICIDES, BY COUNTRY AND BY CYCLE, 1972<sup>a)</sup>

Country or other political or administrative unit	1st Cycle			2nd Cycle			3rd Cycle			4th Cycle			Total sprayings
	Houses planned	Houses sprayed	% sprayed	Houses planned	Houses sprayed	% sprayed	Houses planned	Houses sprayed	% sprayed	Houses planned	Houses sprayed	% sprayed	
Argentina .....	3 614	3 787	110.9	...	32 261 <sup>b)</sup>	-	-	-	-	-	-	-	36 048
Bolivia .....	34 934	31 117	89.1	38 828	34 217	88.1	-	-	-	-	-	-	77 492 <sup>c)</sup>
Brazil .....	3 589 343	3 237 051	90.2	3 462 691	3 562 029	102.9	-	-	-	-	-	-	6 799 080
Colombia (Semestrial) ....	262 803	241 224	91.8	277 866	246 530	88.7	-	-	-	-	-	-	487 754
(Quarterly cycles) .....	10 207	8 668	84.9	10 507	4 456	42.4	-	-	-	-	-	-	13 124
(Annual cycle) .....	161 643	138 388	85.6	-	-	-	-	-	-	-	-	-	170 534 <sup>d)</sup>
Costa Rica (Semestrial)....	45 747	45 738	100.0	47 422	46 838	98.8	-	-	-	-	-	-	92 576
(Quarterly cycles) .....	1 280	1 187	92.7	1 194	1 198	100.3	1 224	1 259	102.9	1 259	1 229	97.6	4 873
(Quarterly, Propoxur)....	-	-	-	2 710	2 540	93.7	2 713	2 518	92.8	2 745	2 600	94.7	7 658
Dominican Republic .....	15 250	13 550	88.9	10 768	9 528	88.5	-	-	-	-	-	-	23 078
Ecuador .....	360 980	276 096	76.5	160 998	153 605	95.4	197 132 <sup>e)</sup>	181 697 <sup>e)</sup>	92.2	-	-	-	611 398
El Salvador (Semestrial)...	91 600	89 051	97.2	91 600	89 438	97.6	-	-	-	-	-	-	178 489
(Quarterly, Propoxur) ...	61 521	57 684	93.8	61 521	60 835	98.9	61 521	62 682	101.7	61 521	62 156	101.0	243 357 <sup>f)</sup>
Guatemala (Semestrial)....	144 441	131 994	91.4	140 956	132 771	94.2	-	-	-	-	-	-	264 765
(Quarterly cycles) .....	16 894	14 901	88.2	16 620	15 033	90.5	15 940	14 674	92.1	16 068	16 087	100.1	60 695
(Quarterly, Propoxur)....	61 964	50 760	81.9	66 758	64 535	96.7	69 794	67 539	96.8	70 401	66 964	95.1	249 798
Guyana .....	1 880	1 186	63.1	1 880	1 449	77.1	-	-	-	-	-	-	4 770 <sup>g)</sup>
Haiti .....	841 613	807 258	95.9	620 267	603 769	97.3	-	-	-	-	-	-	1 411 027
Honduras (Semestrial)....	45 326	44 612	98.4	45 867	46 196	100.7	-	-	-	-	-	-	177 926 <sup>h)</sup>
(Trimestrial, DDT) .....	23 751	23 987	101.0	24 498	24 894	101.6	25 180 <sup>i)</sup>	25 053 <sup>i)</sup>	99.5	-	-	-	73 934
(Quarterly, Propoxur)....	37 684	35 933	95.4	34 314	33 256	96.9	34 855	33 765	89.2	35 373	34 078	96.3	137 032
Mexico (Semestrial, Attack)	2 373 541	2 305 182	97.1	2 149 006	2 151 719	100.1	-	-	-	-	-	-	4 456 901
(Semestrial, Consolidation)	129 692	128 553	99.1	107 361	110 073	102.5	-	-	-	-	-	-	238 626
(4-Months cycles) .....	96 125	94 865	98.7	86 515	87 083	100.7	88 300	87 723	99.3	-	-	-	269 671
Nicaragua (Semestrial)....	13 843	10 854	78.4	11 803	8 722	73.9	-	-	-	-	-	-	19 576
(Quarterly, Propoxur)....	91 316	86 823	95.1	97 026	90 812	93.6	99 284	91 932	92.6	100 859	86 913	86.2	356 480
Panama (Semestrial) .....	132 985	125 341	94.3	131 447	126 006	95.9	-	-	-	-	-	-	251 347
(Quarterly cycles) .....	13 996	13 315	95.1	13 996	12 246	87.5	10 519	9 727	92.5	8 653	7 334	84.8	42 622
Paraguay .....	191 980 <sup>j)</sup>	187 529 <sup>j)</sup>	97.7	145 124	47 457 <sup>k)</sup>	32.7	-	-	-	-	-	-	239 235 <sup>l)</sup>
Peru (Semestrial) .....	114 752	116 488	101.5	114 752	113 117	98.6	-	-	-	-	-	-	229 605
(Quarterly cycles) .....	12 021	12 568	104.6	12 021	12 349	102.7	12 021	12 019	100.0	-	-	-	36 936
Venezuela (Semestrial) ....	90 313	84 498	93.6	89 362	87 728	98.2	-	-	-	-	-	-	172 226
(4-Months cycles) .....	31 887	16 417	51.5	20 768	22 862	110.1	31 050	23 911	77.0	-	-	-	63 190
(Quarterly cycles) .....	57 118	47 803	83.7	48 748	47 536	97.5	37 525	37 135	99.0	36 570	35 977	98.4	168 451
Belize .....	12 274	12 060	98.3	12 070	10 238	84.8	-	-	-	-	-	-	22 298
French Guiana .....	15 899	12 361	77.7	-	-	-	-	-	-	-	-	-	12 361
Surinam <sup>m)</sup> .....	620	233	37.6	620	254	41.0	-	-	-	-	-	-	487
Total .....	9 190 837	8 509 062	92.6	8 157 884	8 093 580	99.2	687 058	651 634	94.8	477 449	313 338	65.6	17 705 420

a) DDT sprayings unless otherwise indicated. b) Houses sprayed in areas in consolidation phase (Jan-Dec.). c) Includes 12 158 quarterly sprayings. d) Includes 32 146 houses of an area sprayed once a year. e) One cycle from July to December, DDT 1 g./m<sup>2</sup>. f) In addition 298 746 houses were partially sprayed with Propoxur. g) Includes 2 135 houses sprayed once a year. h) Includes 87 118 houses sprayed once a year, from April to December. i) One cycle from July to December. j) Cycle from April to October. k) Cycle not yet finished. l) Includes 4 249 houses sprayed in four quarterly cycles. m) Houses sprayed with dieldrin.



Table 14

## INSECTICIDES USED IN THE MALARIA ERADICATION PROGRAMS

Country or other political or adminis- trative unit	DDT (kg.)				Propoxur (kg.)		Other	
	1971		1972		1971	1972	1971	1972
	100%	75%	100%	75%				
Argentina .....	1 144	26 283	1 261	21 267	-	-	-	-
Bolivia .....	...	...	87	50 830	-	-	-	-
Brazil .....	201 494	2 384 463	248 354	3 810 533	-	-	-	-
Colombia .....	10 099	685 128	5 878	543 598	-	-	111a)	4 048a)
Costa Rica .....	8 616	78 811	7 308	66 717	2 698	2 857	-	-
Dominican Republic .....	3 243	18 514	2 442	9 143	-	-	-	-
Ecuador .....	3 842	545 018	2 634	457 507	-	-	-	-
El Salvador .....	2 081	69 862	3 389	107 934	65 282	218 677	-	-
Guatemala .....	2 093	215 480	2 512	214 850	81 000	145 405	-	-
Guyana .....	94	1 097	146	1 451	-	-	-	-
Haiti .....	2 028	574 661	1 987	516 467	-	-	-	11 352b)
Honduras .....	847	42 012	1 750	119 138	45 337	69 422	129c)	415c)
Mexico .....	82 725	3 230 949	66 686	3 034 959	-	-	17 792a)	14 577a)
Nicaragua .....	379	15 221	180	8 278	97 425	140 550	8 435d)	-
Panama .....	33 641	222 210	23 342	152 257	-	2 110	-	-
Paraguay .....	-	370 000	-	265 000	-	-	-	-
Peru .....	-	165 676	-	211 126	-	-	600e)	-
Venezuela .....	15 182	263 068	18 959	300 938	-	-	28 985f)	9 595g)
Belize .....	2 071	13 540	2 185	11 016	-	-	-	-
Guayana Francesa .....	...	...	...	...	...	...	...	...
Surinam .....	-	-	-	-	-	-	640h)	521h)
AMRO-0216 .....	-	-	-	-	10 414	11 569	272c)	190c)

a) BHC 25%. b) Malation 95%. c) Liters of Propoxur emulsion. d) Malation 50%. e) BHC 30%. f) 18 524 kg. Baygon 50%; 809 kg. DDT 50% and 9 652 kg. DDT 30%. g) 2 997 kg. Baygon 50%; 764 kg. DDT 50% and 5 834 kg. DDT 30%. h) Dieldrin 50%.

Table 15

## MEANS OF TRANSPORT IN MALARIA ERADICATION PROGRAMS IN THE AMERICAS, 1972

Country or other political or adminis- trative 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	70	39	22	13	6	6	-	-	25	20	3	-	-	1	5	-	-
Bolivia .....	-	-	4	7	13	26	1	-	-	30	25	23	8	14	-	6	94	25	41 <sup>c)</sup>
Brazil .....	20	23	161	193	316	417	32	-	-	-	241	361	125	180	-	-	1 588	12 <sup>d)</sup>	-
Colombia .....	12	1	81	67	179	26	35	9	20	-	164	10	231	36	48	12	1 659	341	60
Costa Rica .....	1	-	14	2	13	2	6	-	40	5	45	40	16	23	13	8	39	-	-
Dominican Republic .....	1	-	52	-	2	-	6	-	136 <sup>e)</sup>	-	-	-	-	-	-	-	65	-	-
Ecuador .....	2	1	41	5	50	3	8	2	24	17	26	4	14	7	25	5	388	1	-
El Salvador .....	-	1	36	8	30	5	5	-	75	25	18	-	7	-	-	-	-	7	-
Guatemala .....	2	1	46	8	35	3	6	2	75	14	38	20	15	2	-	-	10	8	-
Guyana .....	-	1	-	-	6	2	-	-	-	-	5	2	11	1	-	-	9	-	-
Haiti .....	6	1	71	5	59	5	21	-	-	-	-	-	1	-	-	-	-	-	-
Honduras .....	2	2	30	5	24	1	9	-	31	40	-	-	-	-	-	-	90	-	-
Jamaica .....	-	-	-	-	15	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Mexico .....	22	15	175	349	451	316	-	-	-	-	-	-	49	3	-	-	2 416	-	-
Nicaragua .....	-	2	18	2	7	8	3	2	-	10	-	-	16	-	1	-	-	-	1
Panama .....	1	-	4	42	10	20	-	11	-	49	4	-	18	40	-	-	-	81 <sup>c)</sup>	10 <sup>c)</sup>
Paraguay .....	2	-	43	35	13	-	17	-	44	6	50	-	21	-	-	-	-	41 <sup>c)</sup>	-
Peru .....	2	-	41	7	13	6	41	25	5	-	-	-	106	15	-	-	-	4	-
Trinidad and Tobago .....	3	-	-	-	10	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Venezuela .....	6	-	138	-	112	-	37	-	18	-	333	-	128	-	-	-	685	84 <sup>f)</sup>	-
Belize .....	-	-	-	3	1	5	-	2	-	-	-	2	7	1	-	-	-	-	-
Canal Zone .....	-	-	2 <sup>g)</sup>	-	-	-	-	-	-	-	-	-	2 <sup>g)</sup>	-	2 <sup>g)</sup>	-	-	-	-
French Guiana .....	1	-	-	1	3	2	-	3	-	-	-	-	3	-	-	-	-	7 <sup>c)</sup>	2 <sup>c)</sup>
Surinam .....	-	-	3	-	1	-	3	1	-	12	-	-	15	3	-	-	-	-	-
Total .....	85	51	1 030	778	1 385	860	236	63	468	208	974	482	796	325	89	32	7 048	611	114

a) In good conditions. b) In bad conditions. c) Out-board motors. d) 5 airplanes, 7 cranes. e) Property of the users. f) Fogging machines and equipment for ULV. g) Part-time.

Table 16

## COMPARATIVE RESULTS OF ACTIVE AND PASSIVE CASE DETECTION IN MALARIA ERADICATION PROGRAMS IN THE AMERICAS, 1972

Country or other political or administrative unit	Active case detection					Passive case detection						Total	
	Average number of evaluators	Blood slides			Average production per evaluator per month	Average number of notification posts	Average of notification post producing slides per month	Blood slides			Average of slides per month per productive notification post	Blood slides	
		Examined	Positive	Per cent				Examined	Positive	Per cent		Examined	Positive
Argentina .....	148	40 318	176	0.4	22.7	779	209	59 488	183	0.3	23.7	99 806	359
Bolivia .....	107	107 869	1 771	1.6	84.0	2 680	408	24 881	2 504	10.1	5.1	132 750	4 275
Brazil .....	3 534	1 678 231	32 702	1.9	39.6	24 265	10 180	613 451	52 623	8.6	5.0	2 291 682	85 325
Colombia .....	1 020	414 487	12 105	2.9	33.9	9 133	5 413	231 912	18 892	8.1	3.6	646 399	30 997
Costa Rica .....	111	184 919	90	0.0	138.8	1 584	193	6 233	69	1.1	2.7	191 152	159
Cuba .....	...	63 929	1	0.0	-	...	...	447 824	33	0.0	-	511 753	34
Dominican Republic ....	143	250 392	243	0.1	145.9	4 844	1 720	142 002	18	0.0	6.9	392 394	261
Ecuador .....	103	119 501	568	0.5	96.7	5 518	2 749	202 110	6 141	3.0	6.1	321 611	6 709
El Salvador .....	90	78 810	1 924	2.4	73.0	2 672	2 097	316 125	36 411	11.5	12.6	394 935	38 335
Guatemala .....	98	137 494	1 755	1.3	116.9	5 013	2 292	207 662	5 995	2.9	7.6	345 156	7 750
Guyana .....	28	51 373	262	0.5	152.9	264	7	8 558	4	0.0	101.9	59 931	266
Haiti .....	59	93 182	3 036	3.3	131.6	6 000	3 236	195 963	16 024	8.2	5.1	289 145	19 060
Honduras .....	39	51 190	1 245	2.4	109.4	2 893	1 349	175 389	17 406	9.9	10.8	226 579	18 651
Jamaica .....	-	3 940	-	-	-	-	-	25 088	1	0.0	-	29 028	1
Mexico .....	728	1 954 664	12 978	0.7	223.8	57 755	6 083	375 003	13 238	3.5	16.9	2 329 667	26 216
Nicaragua .....	108	38 505	178	0.5	29.7	3 834	1 854	169 727	9 417	5.5	7.6	208 232	9 595
Panama .....	148	240 311	651	0.3	135.3	1 273	414	28 787	168	0.6	5.8	269 098	819
Paraguay .....	120	56 613	36	0.1	39.3	3 953	1 447	129 046	58	0.0	7.4	185 659	94
Peru .....	150	224 690	5 218	2.3	124.8	6 250	1 450	116 394	4 052	3.5	5.6	341 084	9 270
United States .....	-	-	-	-	-	-	-	358 <sup>a</sup>	546	-	-	358	546
Trinidad and Tobago ....	-	4 637	-	-	-	-	-	10 708	2	0.0	-	15 345	2
Venezuela .....	339	189 213	8 168	4.3	46.5	2 358	453	73 742	9 894	13.4	13.6	262 955	18 062
Belize .....	11	17 120	62	0.4	129.7	115	34	2 715	24	0.9	6.7	19 835	86
Canal Zone .....	-	1 501	0	-	-	...	...	37 395	41	0.1	-	38 896	41
Dominica .....	-	-	-	-	-	-	-	30	0	-	-	30	0
French Guiana .....	4	2 494	62	2.5	52.0	...	...	5 103	130	2.5	-	7 597	192
Grenada .....	-	1	1	100.0	-	-	-	1 025	0	-	-	1 026	1
Puerto Rico .....	-	-	-	-	-	-	-	...	5	-	-	...	5
St. Lucia .....	-	-	-	-	-	-	-	27	1	3.7	-	27	1
Surinam .....	26	36 523	271	0.7	117.1	36	16	23 077	529	2.3	120.2	59 600	800
Total .....	-	6 041 907	83 503	1.4	-	-	-	3 629 823	194 409	5.4	-	9 671 730	277 912

a) Slides examined at CDC.

Table 17

**PERSONNEL EMPLOYED IN MALARIA ERADICATION PROGRAMS IN THE AMERICAS  
31 DECEMBER 1971 AND 1972, BY CATEGORY**

(Part-time personnel in parentheses)

	Title	1971	1972
SPRAYING OPERATIONS	Engineers .....	128 (3)	111 (1)
	Spraying Chiefs .....	295 (30)	307 (2)
	Sector Chiefs .....	745	716
	Squad Chiefs .....	2 955	3 008 (32)
	Spraymen .....	12 388 (224)	12 757 (108)
	Draftsmen .....	112	111
	SUB-TOTAL .....	16 623 (267) <sup>a)</sup>	17 010 (143) <sup>a)</sup>
EPIDEMIOLOGICAL OPERATIONS	Physicians .....	242 (3)	224 (4)
	Entomologists .....	57 (3)	56 (1)
	Assistant Entomologists .....	147 (3)	185 (5)
	Statisticians and Statisticians' Assistants .....	188 (1)	420
	Evaluation Inspectors .....	1 521 <sup>b)</sup>	1 520 (155) <sup>b)</sup>
	Evaluators .....	6 567 <sup>b)</sup>	6 315 <sup>b)</sup>
	Microscopists .....	872 (14)	862 (12)
	SUB-TOTAL .....	9 594 (25)	9 582 (177)
ADMINISTRATION AND OTHERS	Administrators .....	98	91
	Administrative Assistants .....	760	770
	Accountants .....	50	48
	Disbursing Officers .....	53	58
	Storekeepers .....	89	96
	Storekeepers' Assistants .....	87	83
	Secretaries .....	272	237
	Others .....	1 016	930
	SUB-TOTAL .....	2 425	2 313
TRANSPORT	Transport Chiefs, Mechanics and Assistant Mechanics .....	717	707
	Drivers .....	1 303 (2)	1 333 (2)
	Motorboat Operators .....	416 (2)	360 (2)
	Boatmen .....	35	43
	SUB-TOTAL .....	2 471 (4)	2 443 (4)
GRAND TOTAL .....		31 113 (296)	31 348 (324)

a) In some programs this personnel performs epidemiological activities.

b) Includes personnel with same category from the mass drug distribution program.

Table 18

**PERSONNEL EMPLOYED IN SPRAYING OPERATIONS IN MALARIA ERADICATION PROGRAMS  
IN THE AMERICAS - 31 DECEMBER 1972**

(Part-time personnel in parentheses)

Country or other political or adminis- trative unit	Total	Engineers	Sanitarians or Spraying Chiefs	Sector Chiefs	Squad Chiefs	Spraymen	Draftsmen
Argentina .....	68	2	9	5	15	35	2
Bolivia .....	47 (113)	2	9	24	1 (32)	10 (81)	1
Brazil .....	7 684	33 <sup>a)</sup>	78	73	1 186	6 296	18
Colombia .....	910	10	20	67	218	578	17
Costa Rica .....	98	-	3	9	17	68	1
Dominican Republic ....	22	1	2	-	4	14	1
Ecuador .....	672	3	8	47	112	499 <sup>b)</sup>	3
El Salvador .....	359	1	6	12	61	277 <sup>b)</sup>	2
Guatemala .....	470	1 <sup>c)</sup>	10	32	78	345 <sup>b)</sup>	4
Guyana .....	7 (7)	-	1	-	1	5 (7) <sup>d)</sup>	-
Haiti .....	918	2	2	56	144	707	7
Honduras .....	244	-	5	8	38	193	-
Mexico .....	3 714	46	110	238	855	2 431	34
Nicaragua .....	249	1	9	21 <sup>e)</sup>	36	181 <sup>b)</sup>	1
Panama .....	297	-	2	27	42	224	2
Paraguay .....	254	2	9 <sup>e)</sup>	21	45	171	6
Peru .....	337	3	21	28	44	235	6
Trinidad and Tobago ...	83	-	1	1	2	76 <sup>b)</sup>	3
Venezuela .....	453	4	-	35	90	322	2
Belize .....	20	-	1	1	3	15	-
Canal Zone .....	(23)	(1)	(2)	-	-	(20) <sup>b)</sup>	-
French Guiana .....	66	-	-	3	16	47	-
Surinam .....	38	-	1	8	-	28	1
<b>Total .....</b>	<b>17 010 (143)</b>	<b>111 (1)</b>	<b>307 (2)</b>	<b>716</b>	<b>3 008 (32)</b>	<b>12 757 (108)</b>	<b>111</b>

a) Includes 5 architects, 11 agronomists, 10 pharmacists and 2 veterinarians. b) Includes personnel from the larviciding program. c) Chief of field operations. d) Are also medicated salt plant workers. e) Performing epidemiological evaluation activities also.

Table 19

**PERSONNEL EMPLOYED IN EPIDEMIOLOGICAL EVALUATION OPERATIONS IN MALARIA ERADICATION  
PROGRAMS IN THE AMERICAS - 31 DECEMBER 1972**

(Part-time personnel in parentheses)

Country or other political or adminis- trative unit	Total	Physicians	Entomologists	Assistant Entomologists	Statisticians and Statisticians' Assistants	Evaluation Inspectors	Evaluators	Microscopists and laboratory personnel
Argentina .....	219	3	1	2	3	26	160	24
Bolivia .....	120	6	1	-	6	-	93	14
Brazil .....	3 776	51 <sup>a)</sup>	12	39	255	841 <sup>b)</sup>	2 312	266
Colombia .....	1 280	17	4	2	19	173	1 020 <sup>c)</sup>	45
Costa Rica .....	161	2	-	3	-	15	127	14
Dominican Republic .....	231	2	1	3	4	23	157	41
Ecuador .....	193	10	2	3	4	11	131 <sup>c)</sup>	32
El Salvador .....	162	6	1	12	1	21	90	31
Guatemala .....	209	5	1	13	10	9	144	27
Guyana .....	60 (2)	(2)	-	-	12	6	35	7
Haiti .....	298	10	1	16	14	12 <sup>c)</sup>	203 <sup>c)</sup>	42
Honduras .....	108	4	1	8	8	7	43	37
Jamaica .....	50	13	-	30	1	-	-	6
Mexico .....	1 154	63	17	6	15	150	768	135
Nicaragua .....	150	3	1	10	11	-	108	17
Panama .....	208	1	1	9	8	17 <sup>c)</sup>	153	19
Paraguay .....	163	5	2	7	12	3	120	14
Peru .....	374(155)	8	5	-	25	126(155) <sup>c)</sup>	178	32
Trinidad and Tobago .....	93	1	1	4	1	-	78	8
Venezuela .....	508	12	2	16	9	71	356	42
Belize .....	13 (3)	(1)	-	(2)	-	1	10	2
Canal Zone .....	(17)	(1)	(1)	(3)	-	-	-	(12)
French Guiana .....	15	1	2	2	-	4	4 <sup>c)</sup>	2
Surinam .....	37	1	-	-	2	4	25	5
<b>Total .....</b>	<b>9 582(177)</b>	<b>224 (4)</b>	<b>56 (1)</b>	<b>185 (5)</b>	<b>420</b>	<b>1 520(155)</b>	<b>6 315</b>	<b>862 (12)</b>

a) Includes 6 pharmacists, 4 veterinarians and 2 biologists.

b) Also performing activities in spraying operations.

c) Includes personnel with same category from mass drug distribution activities.

Table 20

**PERSONNEL EMPLOYED IN ADMINISTRATIVE AND OTHER SERVICES IN MALARIA ERADICATION PROGRAMS  
IN THE AMERICAS - 31 DECEMBER 1972**

(Part-time personnel in parentheses)

Country or other political or adminis- trative unit	Total	Adminis- trators	Adminis- trative Assistants	Accountants	Disbursing Officers	Storekeepers	Storekeepers' Assistants	Secretaries	Other
Argentina .....	119	3	30	-	-	7	5	2	72
Bolivia .....	31	7	2	1	1	1	2	9	8
Brazil .....	470	41	122	4	10	9	4	5	275
Colombia .....	290	1	19	7	18	18	8	98	121
Costa Rica .....	47	1	-	2	-	1	1	2	40
Dominican Republic ....	38	1	4	1	-	2	2	2	26
Ecuador .....	81	6	2	8	7	8	3	21	26
El Salvador .....	48	1	6	3	1	2	2	7	26
Guatemala .....	82	1	7	3	2	3	1	16	49
Guyana .....	15	-	-	-	-	-	2	1	12
Haiti .....	41	3	3	3	1	4	2	10	15
Honduras .....	26	1	3	1	-	1	1	5	14
Jamaica .....	16	1	8	-	-	2	2	3	-
Mexico .....	634	14	465	2	15	15	31	7	85
Nicaragua .....	57	1	14	1	1	7	3	8	22
Panama .....	65	2	7	6	2	2	2	8	36
Paraguay .....	90	-	42	1	-	2	3	11	31
Peru .....	104	4	31	4	-	5	6	15	39
Trinidad and Tobago ....	40	1	1	1	-	2	2	1	32
Venezuela .....	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)
Belize .....	3	-	-	-	-	-	-	2	1
French Guiana .....	5	1	-	-	-	1	-	3	-
Surinam .....	11	1	4	-	-	4	1	1	-
<b>Total .....</b>	<b>2 313</b>	<b>91</b>	<b>770</b>	<b>48</b>	<b>58</b>	<b>96</b>	<b>83</b>	<b>237</b>	<b>930</b>

a) Services performed by the "Dirección de Malaria y Saneamiento Ambiental" in charge of different programs of environmental sanitation.

Table 21

**PERSONNEL EMPLOYED IN TRANSPORT SERVICES IN MALARIA ERADICATION PROGRAMS  
IN THE AMERICAS - 31 DECEMBER 1972**

(Part-time personnel in parentheses)

Country or other political or adminis- trative unit	Total	Transport Chiefs, mechanics and assistant mechanics	Drivers	Motorboat operators	Boatmen
Argentina .....	75	32	40	3	-
Bolivia .....	41	9	23	9	-
Brazil .....	992	193	756	43	-
Colombia .....	359	90	83	176	10
Costa Rica .....	20	10	10	-	-
Dominican Republic ....	31	13	18	-	-
Ecuador .....	110	9	77	12	12
El Salvador .....	81	22	59	-	-
Guatemala .....	60	16	43	1	-
Guyana .....	21	2	7	7	5
Haiti .....	55	29	24	1	1
Honduras .....	40	18	20	2	-
Jamaica .....	9	4	5	-	-
Mexico .....	246	162	48	36	-
Nicaragua .....	59	12	38	9	-
Panama .....	18	14	3	1	-
Paraguay .....	70	18	47	-	5
Peru .....	75	29	16	30	-
Trinidad and Tobago....	15	-	15	-	-
Venezuela .....	(a)	(a)	(a)	(a)	(a)
Belize.....	2	2	-	-	-
Canal Zone .....	(4)	-	(2)	(2)	-
French Guiana .....	26	2	11	3	10
Surinam .....	38	10	-	28	-
<b>Total .....</b>	<b>2 443 (4)</b>	<b>707</b>	<b>1 333 (2)</b>	<b>360 (2)</b>	<b>43</b>

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



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

The Organization collaborated with the Governments in the establishment of an adequate coordination between general health services and malaria eradication programs. Through these activities, health services are extended to rural communities utilizing, whenever possible, the resources and systems of work of antimalaria programs.

In Colombia, the "Dirección de Campañas Directas," conducts the malaria eradication program, as well as other programs to prevent communicable diseases, using the administrative structure, staff, and facilities of the malaria eradication services.

In Costa Rica, the training of malaria surveillance personnel in other health activities continued. The UNDP approved the Rural Health Project, which will furnish a medical consultant and a nurse. National funds for implementation of the program in 1973 were allocated. The program focuses on the use of the malaria eradication program's surveillance personnel, along with additional personnel, to conduct basic health programs and adequate malaria surveillance for all areas in the consolidation phase.

In Paraguay, the activities of the pilot program to extend health services to rural areas, which uses the surveillance personnel, continued. In addition, a plan to extend health services in Regions III and VI was prepared; the plan will enable the two Regions to take charge of epidemiological surveillance of malaria when the consolidation phase is reached.

In Peru, two plans were drawn-up, one being related to the extension of health services in malarious areas under maintenance phase (southern coastal region), and the other to the coordination and integration of Malaria Eradication program into the health services (northeastern region).

In the Dominican Republic the surveillance personnel of the National Malaria Eradication Service continued to develop multiple health activities. The first cycle of work in the extension of health services to the rural population finished in November. During this cycle, work was accomplished in 1,820 localities with 123,493 houses and 602,122 inhabitants, that is 92.0 per cent of the population in the rural area of Region II (seven provinces). Among the activities, was a survey made by the malaria evaluators to establish the proportion of houses that had latrines and their condition. Findings showed that 19 per cent of the houses had latrines in good condition, 44 per cent in bad condition and 37 per cent had none. The evaluators also assisted in promoting the construction of latrines and in some provinces (Santiago and Espaillat), they took charge of making contracts, delivering materials and collecting fees. In the area served by the Santiago Health Center, for example, up to July there were only 153 latrines constructed, but with the assistance of the evaluators the goal for the year (3,000 latrines) was completed by December. Another survey was carried out by the evaluators to determine the number of newborn children in the Region; 38 per cent had not been inscribed in the Civil Register, and measures were taken to correct this. The multiple health activities carried out included reference of ill individuals from rural areas to health centers and clinics, as well as of mothers and children to maternal and child health clinics.

E. Budget

Table 22 shows national outlays for malaria eradication in 1971 and 1972 as well as the budget estimates for 1973, by country. It does not include outlays for malaria surveillance in those countries that have reached the maintenance phase, where those activities are integrated into the general health services. The table shows separately internal financing, and funds obtained as loans under bilateral agreements. It is to be noted that the estimated budget for 1972 from all funds, increased in relation to 1971, which is indicative of the priority assigned by the Governments of the Americas to malaria eradication.

Internal financing was supplemented by loans from AID (USA) to five countries in the amount of \$3,907,191, and by grants from the same agency to two countries in the amount of \$1,343,117. The financial support of this agency amounted to 7.7 per cent of the total funds used during the period.

In 1973, provision is made for an increase in internal financing in the order of \$1,680,631 over 1972 and \$5,072,960 over the amount spent by the Governments in 1971.

Graph No. 3 shows the contributions of the Governments and the agencies contributing resources to the malaria eradication program in the Americas.

Table 23 shows expenditures by PAHO/WHO in 1972 and the estimated budgetary requirements for assistance to the countries from 1973 to 1975.

Table 22

## NATIONAL EXPENDITURES 1971, 1972 AND BUDGET 1973 FOR MALARIA ERADICATION IN THE AMERICAS

(In U.S. dollars)

Country or other political or adminis- trative unit	National Expenditures 1971			Estimated National Expenditures 1972			National Budget 1973		
	Internal financing	Loans	Total	Internal financing	Loans	Total	Internal financing	Loans	Total
Argentina .....	481 219	-	481 219	786 661	-	786 661	...	...	...
Bolivia .....	187 442	-	187 442	189 843	-	189 843	250 965	-	250 965
Brazil .....	11 629 025	3 749 748	15 378 773	12 990 699	2 859 479	15 850 178	13 280 262	2 093 398	15 373 660
Colombia .....	2 918 489	-	2 918 489	3 048 889	-	3 048 889	2 773 333	-	2 773 333
Costa Rica .....	424 177	238 953	663 130	390 925 <sup>a)</sup>	234 384	625 309	814 696	-	814 696
Cuba .....	...	...	...	...	...	...	...	...	...
Dominican Republic .....	781 860	-	781 860	781 860	-	781 860	781 860	-	781 860
Ecuador .....	710 148	395 183	1 105 331	1 012 480	489 200	1 501 680	960 000	540 000	1 500 000
El Salvador .....	859 407	199 918	1 059 325	944 248	101 902	1 046 150	...	...	...
Guatemala .....	1 586 438	-	1 586 438	1 678 654 <sup>b)</sup>	-	1 678 654	1 768 654	-	1 768 654
Guyana .....	105 909	-	105 909	98 410	-	98 410	151 715	-	151 715
Haiti .....	35 000	-	35 000	35 000	-	35 000	35 000	-	35 000
Honduras .....	713 969	-	713 969	715 024	-	715 024	770 000	-	770 000
Mexico .....	12 650 979	-	12 650 979	12 650 979	-	12 650 979	14 250 979	-	14 250 979
Nicaragua .....	1 038 733	273 390	1 312 123	1 197 576	-	1 197 576	1 335 714	-	1 335 714
Panama .....	680 531	611 663	1 292 194	1 239 770	-	1 239 770	1 757 060	-	1 757 060
Paraguay .....	539 317	410 958	950 275	616 103	222 226	838 329 <sup>a)</sup>	702 723	125 878	828 601
Peru .....	1 065 261	-	1 065 261	1 154 734	-	1 154 734 <sup>a)</sup>	1 489 607	-	1 489 607
Trinidad and Tobago .....	692 800	-	692 800	748 865	-	748 865	809 490	-	809 490
Venezuela .....	5 389 900	-	5 389 900	5 628 887	-	5 628 887	5 575 620	-	5 575 620
Belize .....	42 041	-	42 041	53 529	-	53 529	70 744	-	70 744
French Guiana .....	499 000	-	499 000	418 578	-	418 578	454 545	-	454 545
Surinam .....	353 220	-	353 220	395 480	-	395 480	424 858	-	424 858
Total .....	43 384 865	5 879 813	49 264 678	46 777 194	3 907 191	50 684 385	48 457 825	2 759 276	51 217 101

a) November.

b) Fiscal year not complete.

Table 23

**ESTIMATED REQUIREMENTS FOR MALARIA ERADICATION PROGRAMS  
IN THE AMERICAS a)**

	1972 <sup>b)</sup>	1973 <sup>c)</sup>	1974 <sup>c)</sup>	1975 <sup>c)</sup>
<b>TOTAL COST .....</b>	53 010 893	53 422 394	38 348 534	41 378 617
<b>GOV. AND OTHER SOURCES</b>	50 684 385	51 217 101	36 136 467 <sup>d)</sup>	39 248 214 <sup>d)</sup>
<b>PAHO/WHO PORTION:</b>				
Personnel costs and travel..	1 970 334	1 940 093	1 962 117	1 920 953
Supplies and equipment .....	323 138	240 700	237 750	199 950
Fellowships .....	13 941	11 200	9 800	7 000
Grants and others .....	19 095	13 300	2 400	2 500
<b>SUB-TOTAL PAHO/WHO .....</b>	2 326 508	2 205 293	2 212 067	2 130 403

**SOURCES OF PAHO/WHO FUNDINGS**

SOURCE	1972 <sup>b)</sup>	1973 <sup>c)</sup>	1974 <sup>c)</sup>	1975 <sup>c)</sup>
PAHO-Reg. ....	1 281 963	1 298 094	1 285 790	1 220 449
PAHO-SMF .....	216 049	-	-	-
WHO-Reg. ....	688 096	847 199	893 777	909 954
WHO-TA .....	140 400	60 000	32 500	-
<b>TOTAL .....</b>	2 326 508	2 205 293	2 212 067	2 130 403

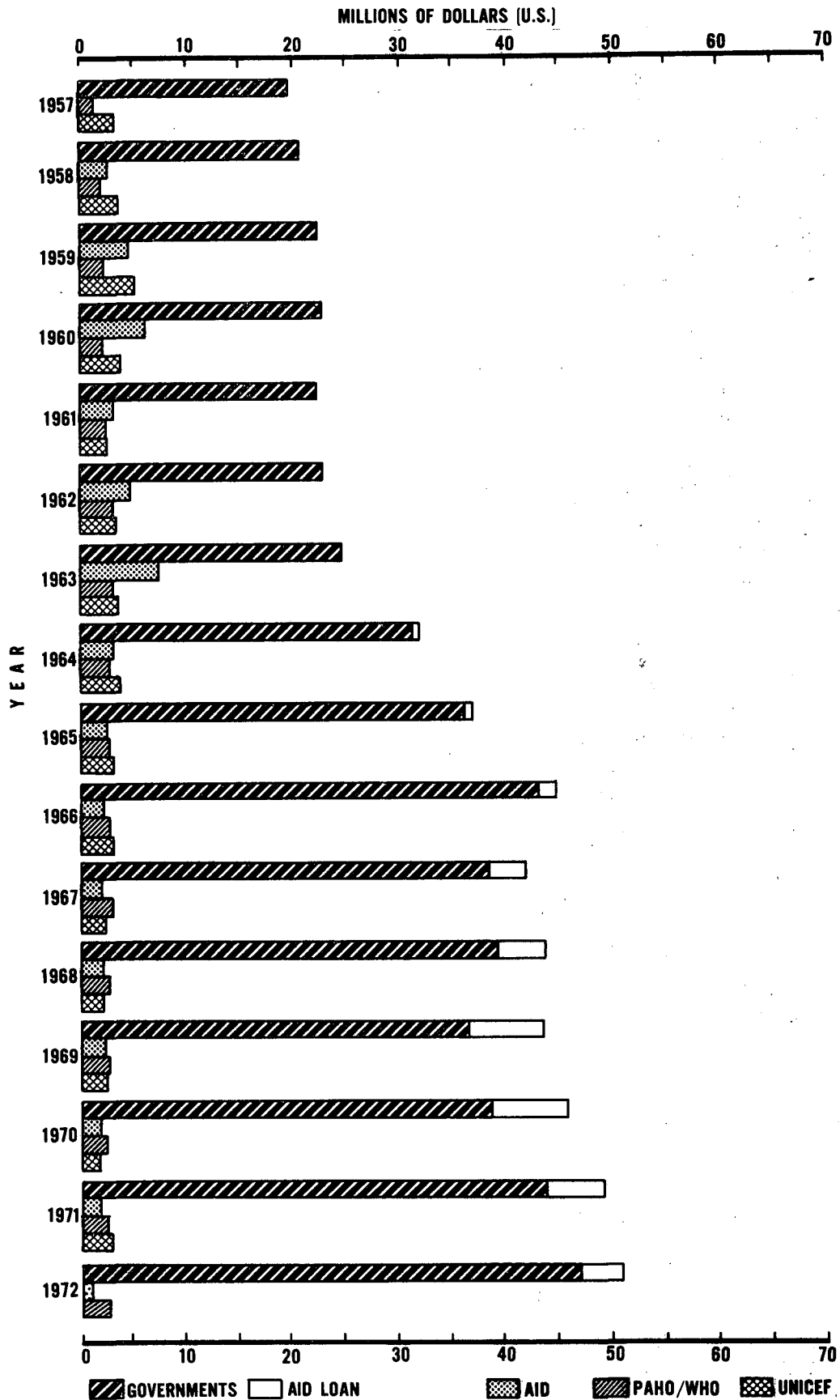
**PAHO/WHO PERSONNEL**

CATEGORY	1972	1973	1974	1975
Medical Officer .....	30	27	26	25
Sanitary Engineer .....	8	8	8	6
Entomologist .....	6	6	6	5
Parasitologist .....	2	2	2	2
Epidemiologist .....	3	2	2	2
Economist .....	1	1	1	1
Statistician .....	1	1	1	1
Adm. Methods Officer .....	2	2	2	2
Assistant Engineer .....	1	1	1	1
Laboratory Adviser .....	1	1	1	1
Sanitary Inspector .....	16	14	12	11
Other .....	15	16	16	16
<b>TOTAL .....</b>	86	81	78	73

- a) Figures shown include all malaria eradication projects, AMRO projects, supporting personnel in Zone Offices and Malaria Eradication Department.  
b) Expenditures.  
c) Estimated requirements.  
d) The national budget from some countries is not available.

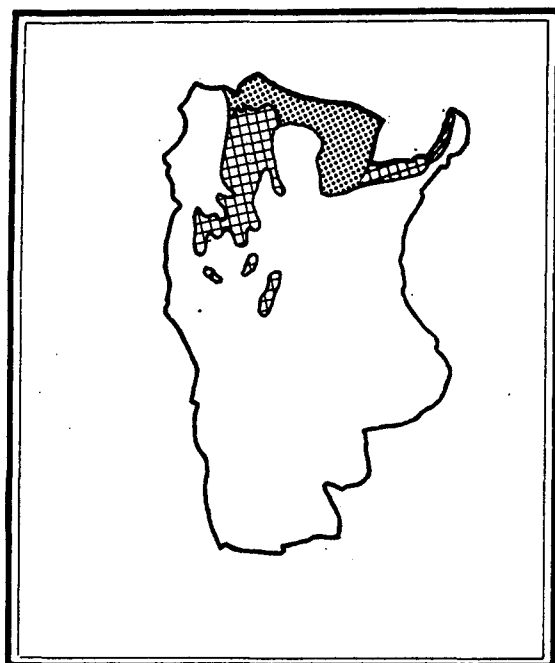
GRAPH 3

# **MALARIA ERADICATION IN THE AMERICAS, EXPENDITURES 1957-1972**



ARGENTINA

## STATUS OF MALARIA PROGRAM AT DECEMBER 1972



	Population (thousands)	Area km <sup>2</sup>
TOTAL COUNTRY	23 893	4 024 458
Non malarious areas	20 932	3 675 407
Originally malarious areas		
Maintenance phase	1 859	133 661
Consolidation phase	1 102	215 390
Attack phase	-	-
Total originally malarious areas	2 961	349 051

## PERSONNEL

Activity	Professional	Non professional	Total
Spraying operations	2	66	68
Evaluation operations	3	216	219
Administrative and other	-	119	119
Transport	-	75	75
Total	5	476	481

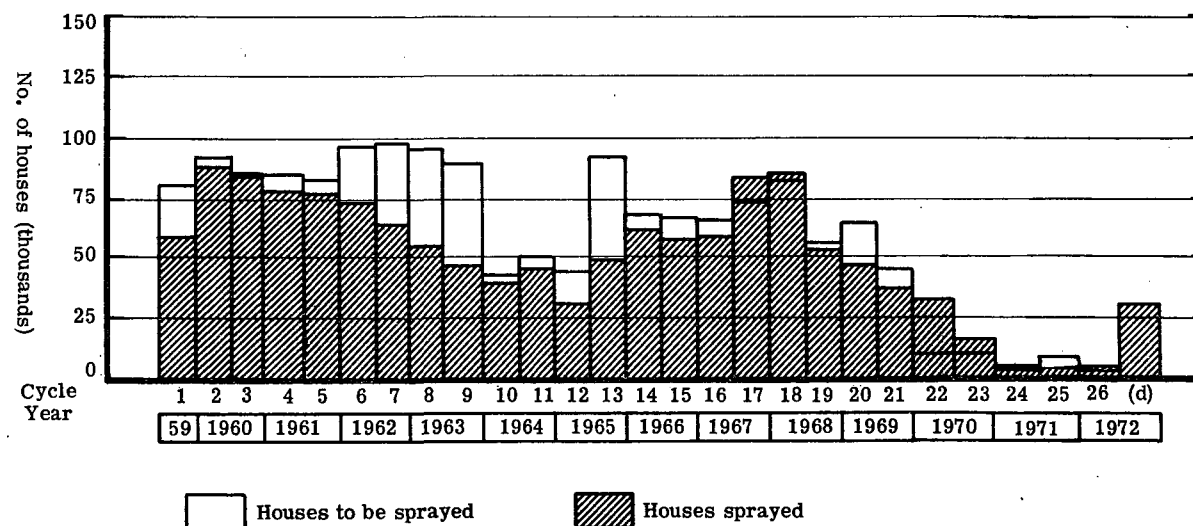
## TRANSPORT FACILITIES

Type	Spraying Operations	Evaluation Operations	Mixed or other operations	Total
Four-wheel vehicles	-	-	161	161
Two-wheel vehicles	-	-	45	45
Boats	-	-	4	4
Animals	-	-	5	5
Other	-	-	-	-
Total	-	-	215	215

## 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 <sup>a)</sup>	288 768	205 189	263	
		2nd	92 438	88 079 <sup>a)</sup>	347 012	330 733	255	...
2nd	Jul. 60-Jul. 61	3rd	84 011	84 929 <sup>a)</sup>	323 610	327 209	305	
		4th	84 077	76 991 <sup>a)</sup>	308 142	282 178	334	...
3rd	Aug. 61-Jun. 62	5th	81 906	75 734 <sup>a)</sup>	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 <sup>a)</sup>	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-Jun. 70	21st	45 571	38 355	157 190	137 817	479	...
		22nd	9 606	33 385 <sup>b)</sup>	36 424	116 440 <sup>b)</sup>	407	9.3
12th	Jul. 70-Jun. 71	23rd	9 606	16 615 <sup>b)</sup>	36 424	64 071 <sup>b)</sup>	401	9.7
		24th	3 707	3 861 <sup>c)</sup>	...	14 666 <sup>c)</sup>	369	9.0
13th	Jul. 71-Jun. 72	25th	7 492	3 507 <sup>c)</sup>	...	10 946 <sup>c)</sup>	392	9.2
		26th	3 614	3 787	...	15 100	414	9.0
14th	Jan. 72-Dec. 72	-	...	32 261 <sup>d)</sup>	...	97 223 <sup>d)</sup>	...	...

a) Some houses were sprayed once a year. b) Includes houses sprayed in consolidation phase areas. c) In addition 28 909 houses were sprayed and 99 373 inhabitants protected in consolidation phase areas. d) Houses and inhabitants protected in consolidation phase areas.



## EPIDEMIOLOGICAL EVALUATION OPERATIONS, ATTACK PHASE AREAS

Year	Slides examined			Species found		
	Total No.	Positive		<u>P. falciparum</u>	<u>P. vivax</u>	<u>P. malariae</u>
		Number	Percentage			
1959 <sup>a)</sup>	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	99 668	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	-
1970	7 979	9	0.1	-	9	-
1971	6 162	2	0.03	-	2	-

## 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	<u>P. falciparum</u>	<u>P. vivax</u>	<u>P. malariae</u>
							from abroad	from areas within country						
1959 <sup>a)</sup>	911	9 491 <sup>a)</sup>	2.5	51	-	-	-	32	-	19	-	-	51	-
1960 <sup>b)</sup>	929	14 438	1.6	26	-	-	-	14	-	12	-	-	26	-
1961 <sup>b)</sup>	1 278	44 395	3.5	17	-	2	-	5	-	10	-	-	17	-
1962 <sup>b)</sup>	1 542	39 675	2.6	23	-	10	-	5	1	7	-	-	20	3
1963 <sup>b)</sup>	1 584	60 742	3.8	11	2	-	-	6	2	-	1	-	9	2
1964 <sup>c)</sup>	1 648	41 926 <sup>c)</sup>	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 <sup>d)</sup>	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	-
1970	1 183	47 206	4.0	70	33	3	13	1	-	2	18	-	70	-
1971	1 211	46 587	3.8	425	250	7	4	-	-	82	82	-	425	-
1972	1 102	46 423	4.2	219	100	5	33	-	-	2	79 <sup>e)</sup>	-	219	-

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

e) Includes 25 cryptic cases.



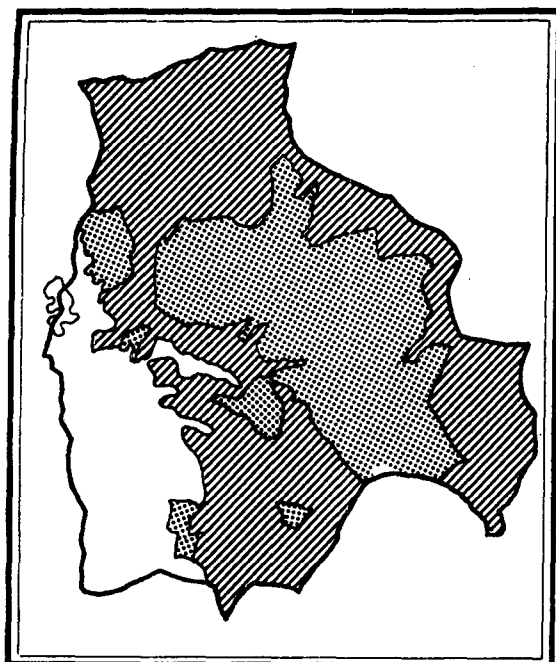
## MAINTENANCE PHASE AREAS

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	<u>P. falciparum</u>	<u>P. vivax</u>	<u>P. malariae</u>
							from abroad	from areas within country						
1964 <sup>a)</sup>	1 021	12 698 <sup>a)</sup>	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 <sup>b)</sup>	-	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	-
1970	1 585	40 225	2.5	7	-	-	1	2	-	2	2	-	7	-
1971	1 603	46 946	2.9	91	13	2	-	-	1	28	47	-	9	1
1972	1 859	53 383	2.9	140	95	6	2	5	-	25	7	-	140	-

a) July-December. b) Cryptic case.

BOLIVIA

## STATUS OF MALARIA PROGRAM AT DECEMBER 1972



	Population (thousands)	Area km <sup>2</sup>
<b>TOTAL COUNTRY</b>	<b>5 208</b>	<b>1 098 581</b>
Non malarious areas	3 531	277 235
<b>Originally malarious areas</b>		
Maintenance phase	-	-
Consolidation phase	999	367 940
Attack phase	678	453 406
<b>Total originally malarious areas</b>	<b>1 677</b>	<b>821 346</b>

## PERSONNEL

Activity	Professional	Non professional	Total
Spraying operations	2	45 (113)	47 (113)
Evaluation operations	6	114	120
Administrative and other	-	31	31
Transport	-	41	41
<b>Total</b>	<b>8</b>	<b>231 (113)</b>	<b>239 (113)</b>

## TRANSPORT FACILITIES

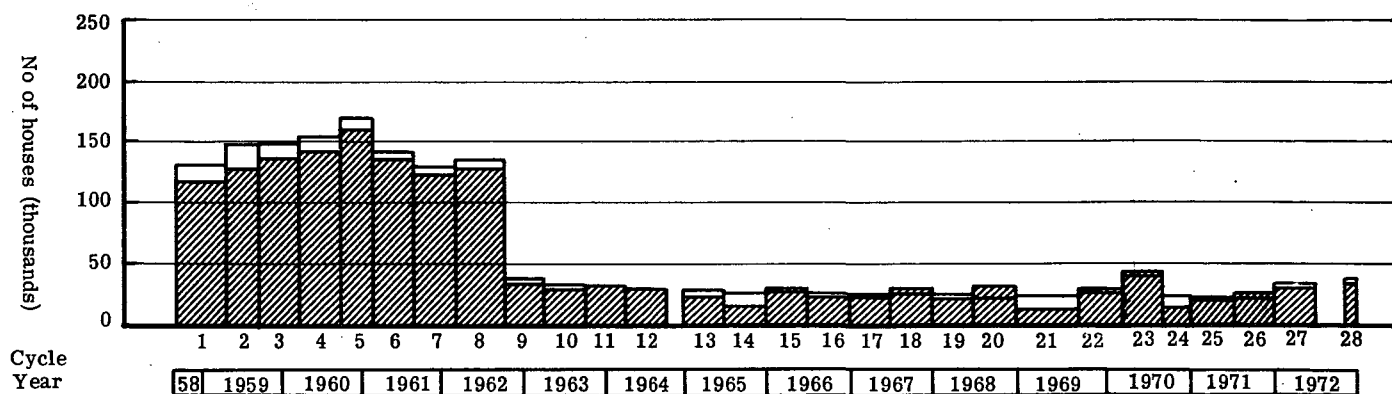
Type	Spraying Operations	Evaluation Operations	Mixed or other operations	Total
Four-wheel vehicles	9	36	6	51
Two-wheel vehicles	-	47	31	78
Boats	16	10	2	28
Animals	-	-	94	94
Other	10	9	47	66
<b>Total</b>	<b>35</b>	<b>102</b>	<b>180</b>	<b>317</b>

(Part-time personnel in parentheses)

## 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 <sup>a)</sup>	-	-	-	86 980	82 565 <sup>a)</sup>	654	-	4.9
		18th	24 992	30 254 <sup>a)</sup>				89 971	90 813 <sup>a)</sup>	584		4.5
10th	Jan. 68-Dec. 68	19th	24 156	20 861 <sup>a)</sup>	-	-	-	80 075	79 631 <sup>a)</sup>	543	-	6.1
		20th	21 387	32 353 <sup>a)</sup>				70 897	95 240 <sup>a)</sup>	609		4.7
11th	Jan. 69- Feb. 70	21st	23 886	14 715 <sup>a)</sup>	-	-	-	84 112	55 933 <sup>a)</sup>	513	-	7.4
		22nd	28 189	32 220 <sup>a)</sup>				100 137	124 712	478		7.1
12th	Mar.70-Dec. 70	23rd	42 220	43 233	-	-	7 502 <sup>b)</sup>	151 351	155 993	571	-	6.4
		24th	24 178	16 187				100 348	65 657	572		6.0
13th	Jan. 71-Dec. 71	25th	23 426	23 888	-	-	7 161 <sup>c)</sup>	76 755	81 089	543	-	6.4
		26th	23 954	27 202				82 252	102 627	531		7.3
14th	Jan. 72-Jun. 72 Oct. 72-Dec. 72	27th	34 934	31 117	-	13 858	12 158 <sup>c)</sup>	125 934	114 501	544	-	6.9
		28th	38 828	34 217				142 173	131 411	491		7.4

a) Includes emergency sprayings. b) Houses sprayed with DDT once a year. c) Houses sprayed with DDT in 3 quarterly cycles.



Houses to be sprayed



Houses sprayed

## EPIDEMIOLOGICAL EVALUATION OPERATIONS, ATTACK PHASE AREAS

Year	Slides examined			Species found		
	Total No.	Positive		<u>P. falci-</u> <u>parum</u> a)	<u>P. vivax</u>	<u>P. malariae</u>
		Number	Percentage			
1958b)	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	133 274	3 360	2.5	787	2 573	-
1970	135 262	5 603	4.1	646	4 957	-
1971	137 570	7 165	5.2	690	6 475	-
1972	109 541	3 714	3.4	364	3 350	-

## 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	<u>P. falci-</u> <u>parum</u>	<u>P. vivax</u>	<u>P. malariae</u>
							from abroad	from areas within country						
1961 <sup>c)</sup>	461	11 975	2.6	14	1	1	5	7	-	-	-	-	14	-
1962 <sup>c)</sup>	759	18 131 <sup>c)</sup>	3.2	21	-	-	2	19	-	-	-	-	21	-
1963 <sup>c)</sup>	1 179	58 587 <sup>c)</sup>	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 <sup>d)</sup>	105	526	-
1968	1 245	89 639	7.2	828	499	13	7	52	-	-	257	184	644	-
1969	1 174	52 025	4.4	1 065	465	13	4	36	-	-	547	104	961	-
1970	1 389	32 003	2.3	1 259	265	1	4	25	-	-	964	5	1 254	-
1971	973	21 216	2.2	915	9	-	32	6	-	-	868	9	906	-
1972	999	23 209	2.3	561	71	-	-	69	-	-	421 <sup>e)</sup>	-	561	-

a) Includes mixed infections. b) September-December. c) January-September. d) Includes 1 congenital case. e) Includes 1 cryptic case.

BRAZIL

## STATUS OF MALARIA PROGRAM AT DECEMBER 1972



	Population (thousands)	Area km <sup>2</sup>
TOTAL COUNTRY	<u>100 254</u>	<u>8 511 965</u>
Non malarious areas	<u>59 584</u>	<u>1 599 731</u>
Originally malarious areas		
Maintenance phase	<u>4 265</u>	<u>82 402</u>
Consolidation phase	<u>14 017</u>	<u>179 025</u>
Attack phase	<u>22 388</u>	<u>6 650 807</u>
Total originally malarious areas	<u>40 670</u>	<u>6 912 234</u>

## PERSONNEL

Activity	Professional	Non professional	Total
Spraying operations	33	7 651	7 684
Evaluation operations	51	3 725	3 776
Administrative and other	41	429	470
Transport	-	992	992
Total	125	12 797	12 922

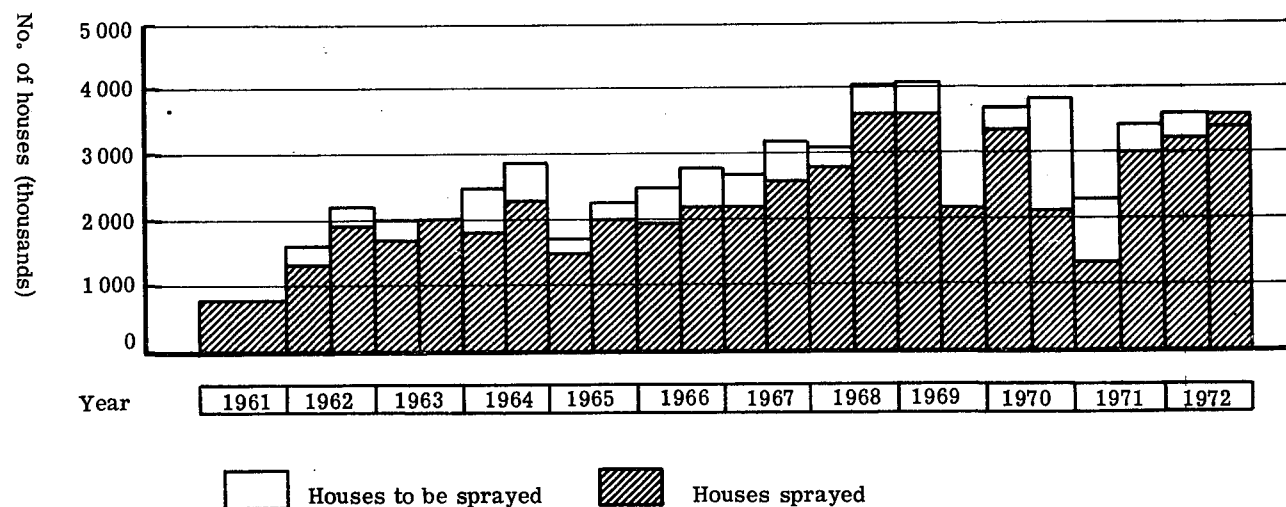
## TRANSPORT FACILITIES

Type	Spraying Operations	Evaluation Operations	Mixed or other operations	Total
Four-wheel vehicles	21	23	1 118	1 162
Two-wheel vehicles	-	602	-	602
Boats	-	-	305	305
Animals	1 588	-	-	1 588
Other	-	-	12	12
Total	1 609	625	1 435	3 669

## SPRAYING OPERATIONS

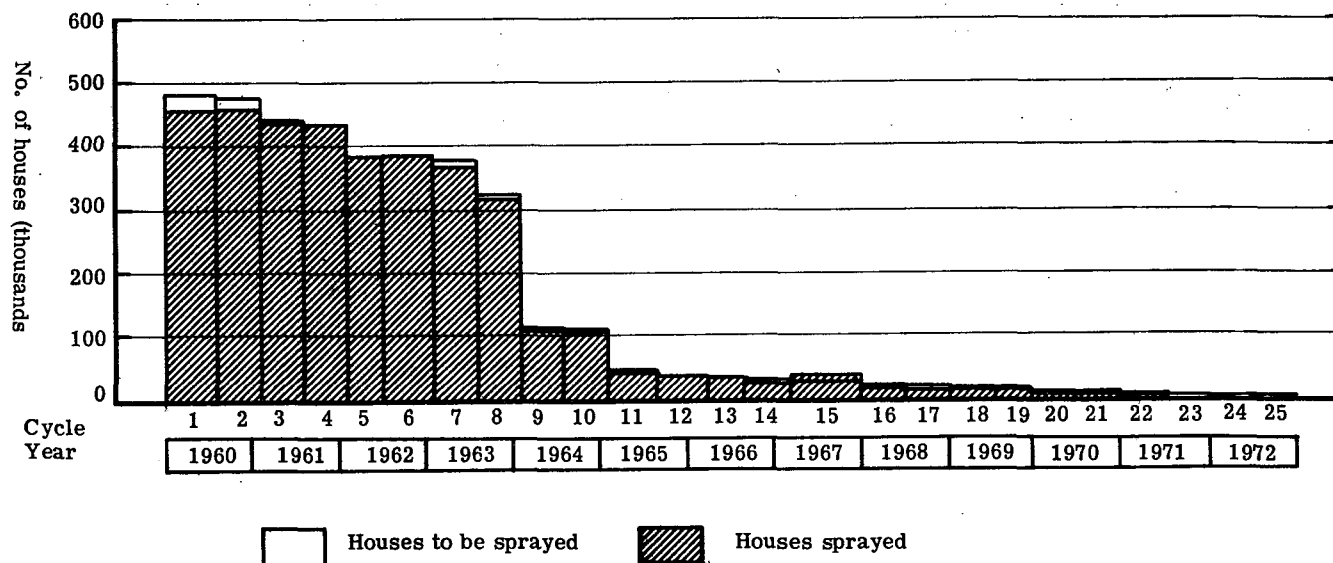
Year of total coverage	Date	Cycle DDT	Houses sprayed		Inhabitants directly protected		Insecticide used per house (g. technical) DDT	Average houses sprayed per spray-man/day
			Planned	Sprayed	Planned	Protected		
(a)	Jan. 61-Nov. 61	(a)	820 095	814 475 <sup>b)</sup>	3 399 300 <sup>c)</sup>	3 380 000 <sup>c)</sup>	...	...
(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 <sup>c)</sup>	8 833 213	421	7.7
	Jul. 67-Dec. 67	...	3 244 299	2 673 073	12 328 336 <sup>c)</sup>	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)	Feb. 70-Jun. 70	...	3 795 372	3 466 314	15 196 516	13 583 020	420	7.5
	Jul. 70-Dec. 70	...	3 837 845	2 120 139	15 363 852	8 188 955	430	7.5
(a)	Jan. 71-Dec. 71	...	2 265 879	1 305 711	8 836 928	5 251 767	433	7.5
		...	3 452 789	3 095 578	13 465 877	12 090 715	456	7.0
(a)	Jan. 72-Dec. 72	...	3 574 130	3 222 996	12 090 394	12 414 387	454	7.4
		...	3 447 863	3 548 605	12 414 387	13 584 673	457	7.1

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



## 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
		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
		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-Jun. 70	19th	22 246	18 628	80 000	62 515	408	8.8
		20th	19 757	17 731	64 000	59 550	395	8.7
11th	Jul. 70-Jun. 71	21th	19 187	16 468	64 276	53 159	381	8.8
		22nd	17 150	16 162	55 650	49 639	402	8.2
12th	Jul. 71-Jun. 72	23rd	16 162	14 484	52 200	45 959	421	8.2
		24th	15 213	14 055	49 500	45 909	398	8.4
13th	Jul. 72-Dec. 72	25th	14 828	13 424	48 500	42 137	408	9.0



BRAZIL (Excl. São Paulo) (Cont.)

## EPIDEMIOLOGICAL EVALUATION OPERATIONS, ATTACK PHASE AREAS

Year	Slides examined			Species found		
	Total No.	Positive		<u>P. falci-</u> <u>parum</u>	<u>P. vivax</u>	<u>P. malariae</u>
		Number	Percentage			
1961	230 205	36 912a)	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 <sup>b)</sup>	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 <sup>c)</sup>	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
1970	1 059 955	53 261	5.02	27 994	25 116	151
1971	1 095 813	78 639	7.17	45 424	32 793	84
1972	1 474 523	83 323	5.65	50 639	32 625	59

## 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	<u>P. falci-</u> <u>parum</u>	<u>P. vivax</u>	<u>P. malariae</u>
							from abroad	from areas within country						
1965	1 439	132 231	9.2	70	1	1	-	60	-	-	8	14	56	-
1966 <sup>d)</sup>	2 541	162 102 <sup>d)</sup>	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	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
1970	7 915	505 319	6.4	147	30	5	-	75	2	1	34	52	94	1
1971	11 009	616 539	5.6	417	26	4	-	149	5	1	232	286	131	-
1972	11 476	576 714	5.0	863	239	3	2	369	4	1	245	377	485	1

## MAINTENANCE PHASE AREAS

1966 <sup>d)</sup>	733	22 161 <sup>d)</sup>	4.0	7	-	-	-	7	-	-	-	3	3	1
1967	756	23 588	3.1	9	1	-	-	8	-	-	-	2	7	-
1968 <sup>c)</sup>	780	19 690	2.5	10	-	-	-	10	-	-	-	-	10	-
1969	804	21 495	2.7	5	-	-	-	4	-	-	1 <sup>e)</sup>	1	4	-
1970	830	21 287	2.6	8	-	-	-	8	-	-	-	4	4	-
1971	843	9 323	1.1	8	-	-	-	8	-	-	-	1	7	-
1972	866	10 364	1.2	5	-	1	-	3	-	-	1	-	5	-

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



## EPIDEMIOLOGICAL EVALUATION OPERATIONS, ATTACK PHASE AREAS

Year	Slides examined			Species found		
	Total No.	Positive		<u>P. falciparum</u>	<u>P. vivax</u>	<u>P. malariae</u>
		Number	Percentage			
1960	114 622	8 297	7.2	66	8 230	1
1961	208 502	7 276	3.5	258	7 015	3
1962a)	370 667	3 689	1.0	227	3 459	3
1963a)	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	-
	35 064	374	1.1	169	204	1
1970	239 691	815	0.3	341	474	-
1971	49 603	439	0.9	230	207	2
1972	48 491	290	0.6	77	213	-

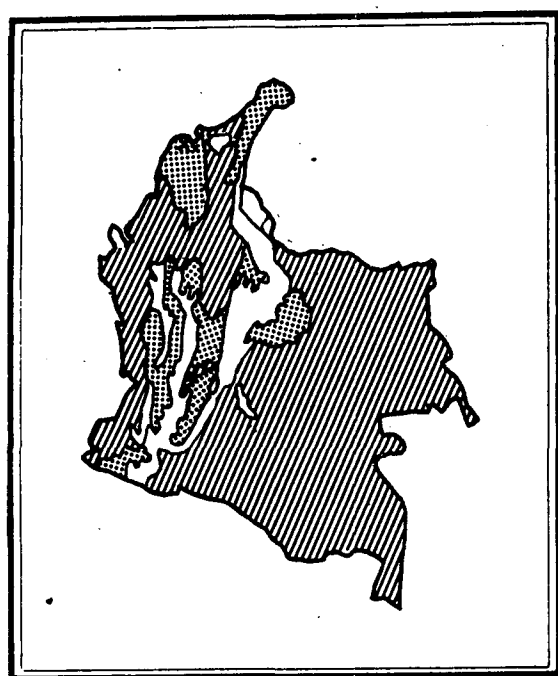
## CONSOLIDATION PHASE AREAS

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	<u>P. falciparum</u>	<u>P. vivax</u>	<u>P. malariae</u>
							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 <sup>b)</sup>	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	-
1970	5 865	204 207	3.5	413	28	2	-	288	1	3	91	166	247	-
1971	5 962	241 334	4.0	791	32	-	-	543	3	1	212	326	460	5
1972	2 541	127 043	5.0	557	57	-	-	329	4	4	163	235	322	-
MAINTENANCE PHASE AREAS														
1972	3 399	54 547	1.6	287	7	-	-	218	1	1	60	92	195	-

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

COLOMBIA

## STATUS OF MALARIA PROGRAM AT DECEMBER 1972



	Population (thousands)	Area km <sup>2</sup>
<b>TOTAL COUNTRY</b>	<b>22 491</b>	<b>1 138 914</b>
Non malarious areas	9 267	168 065
Originally malarious areas		
Maintenance phase	-	-
Consolidation phase	8 926	113 176
Attack phase	4 145	808 651
Preparatory phase	153	49 022
<b>Total originally malarious areas</b>	<b>13 224</b>	<b>970 849</b>

## PERSONNEL

Activity	Professional	Non professional	Total
Spraying operations	10	900	910
Evaluation operations	17	1 263	1 280
Administrative and other	1	289	290
Transport	-	359	359
<b>Total</b>	<b>28</b>	<b>2 811</b>	<b>2 839</b>

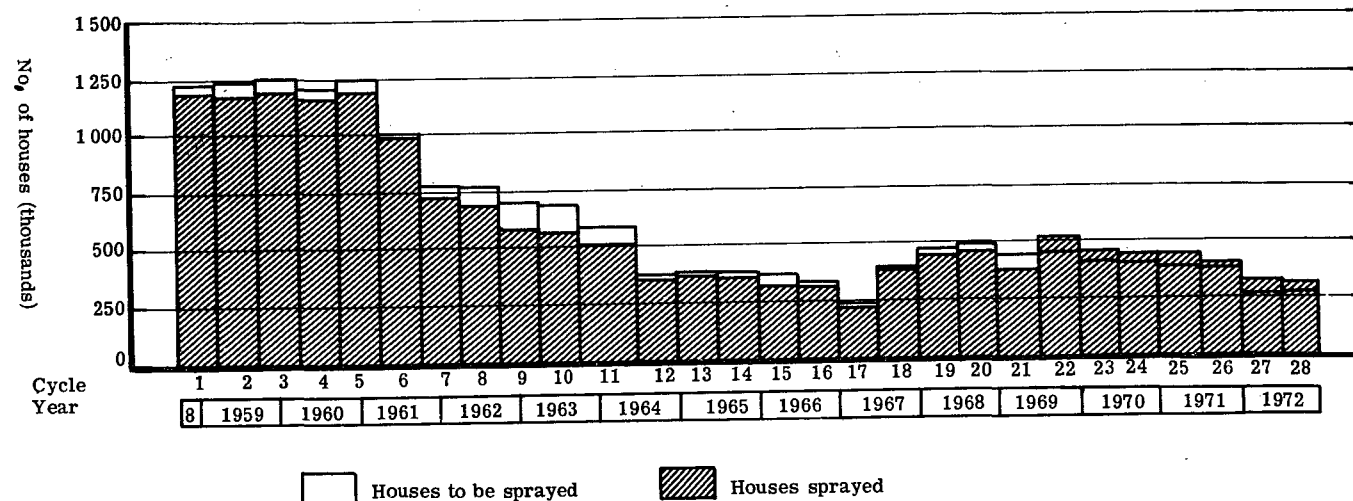
## TRANSPORT FACILITIES

Type	Spraying Operations	Evaluation Operations	Mixed or other operations	Total
Four-wheel vehicles	131	90	189	410
Two-wheel vehicles	-	159	35	194
Boats	107	150	70	329
Animals	680	795	184	1 659
Other	140	185	76	401
<b>Total</b>	<b>1 058</b>	<b>1 379</b>	<b>554</b>	<b>2 991</b>

## 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 501a)	5 320 016	4 788 305	402	9.3
4th	Oct. 61-Sep. 62	7th	796 056	738 459a)	3 997 793	3 708 400	408	8.9
		8th	789 399	693 315a)	3 928 049	3 449 630	421	8.8
5th	Oct. 62-Sep. 63	9th	701 762	586 740b)	3 440 739	2 876 514	435	8.4
		10th	690 726	576 540b)	3 363 145	2 806 950	459	7.9
6th	Oct. 63-Dec. 64	11th	582 580	508 501b)	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 461c)	2 375 849	2 285 575	455	5.3
11th	Jan. 69-Dec. 69	21st	463 187	449 028d)	2 141 790	1 813 709	529	5.5
		22nd	464 692	531 550d)	2 146 877	2 098 882	532	5.5
12th	Jan. 70-Dec. 70	23rd	427 433	466 893e)	1 901 090	1 924 380	518	5.8
		24th	426 724	456 050e)	1 889 861	1 864 001	522	5.6
13th	Jan. 71-Dec. 71	25th	406 230	454 506f)	1 868 658	1 764 643	534	5.4
		26th	399 157	419 404f)	1 726 772	1 732 185	450	5.5
14th	Jan. 72-Dec. 72	27th	262 803	348 337g)	1 156 061	1 127 860	531	5.7
		28th	277 866	323 075g)	1 233 149	1 182 487	467	5.8

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<sup>2</sup>. d) Includes 82 377 houses from quarterly cycles and 34 988 houses in consolidation phase. e) Includes 73 752 houses in quarterly cycles and 28 853 in annual cycles. f) In addition 45 312 houses were sprayed in quarterly cycles and 73 752 houses in annual cycles and 11 634 emergency sprayings. g) Includes 170 534 houses sprayed in annual cycle and 13 124 from quarterly cycles.



## EPIDEMIOLOGICAL EVALUATION OPERATIONS, ATTACK PHASE AREAS

Year	Slides examined			Species found		
	Total No.	Positive		<u>P. falciparum</u> a)	<u>P. vivax</u>	<u>P. malariae</u>
		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
1970	310 339	27 387	8.8	15 680	11 690	17
1971	263 425	18 816	7.1	10 416	8 396	4
1972	307 032	26 924	8.8	15 788	10 952	6

## AREAS EN FASE DE CONSOLIDACION

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	<u>P. falciparum</u>	<u>P. vivax</u>	<u>P. malariae</u>
							from abroad	from areas within country						
1962 <sup>b)</sup>	3 027	70 250 <sup>b)</sup>	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	4.5	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	-
1970	8 382	375 073	4.5	4 885	478	9	70	2 921	5	4	1 398	2 295	2 590	-
1971	8 650	341 348	3.9	3 586	1 067	15	71	1 862	4	7	560	1 306	2 279	1
1972	8 926	339 367	3.8	4 073	946	8	43	2 296	7	4	769 <sup>c)</sup>	1 921	2 152	-

a) Includes mixed infections. b) April-December. c) Includes cryptic cases.

COSTA RICA

## STATUS OF MALARIA PROGRAM AT DECEMBER 1972



	Population (thousands)	Area km <sup>2</sup>
<b>TOTAL COUNTRY</b>	<u>1 836</u>	<u>50 900</u>
Non malarious areas	<u>1 248</u>	<u>15 454</u>
Originally malarious areas		
Maintenance phase	<u>-</u>	<u>-</u>
Consolidation phase	<u>188</u>	<u>11 285</u>
Attack phase	<u>400</u>	<u>24 161</u>
<b>Total originally malarious areas</b>	<u>588</u>	<u>35 446</u>

## PERSONNEL

Activity	Professional	Non professional	Total
Spraying operations	-	98	98
Evaluation operations	2	159	161
Administrative and other	1	46	47
Transport	-	20	20
<b>Total</b>	<b>3</b>	<b>323</b>	<b>326</b>

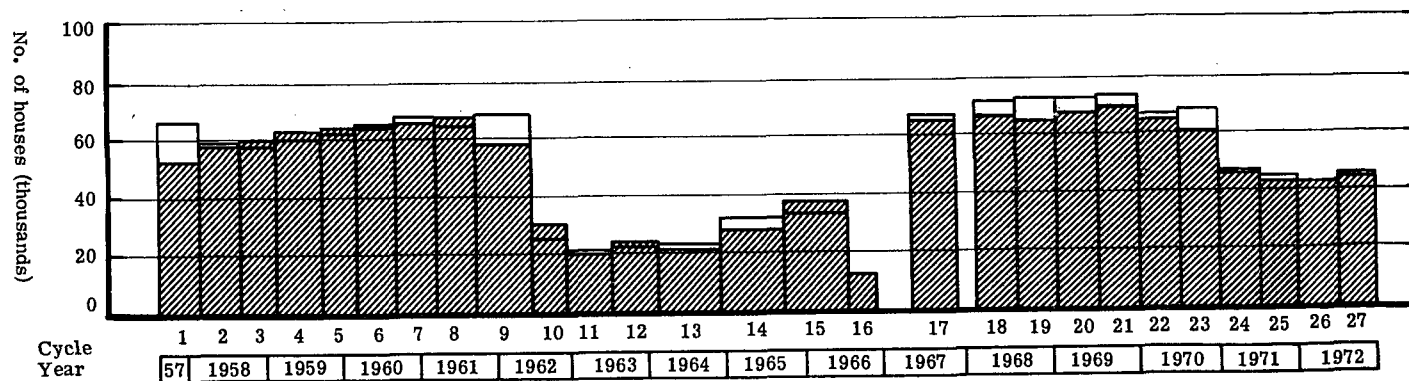
## TRANSPORT FACILITIES

Type	Spraying Operations	Evaluation Operations	Mixed or other operations	Total
Four-wheel vehicles	17	3	18	28
Two-wheel vehicles	-	-	130	130
Boats	-	-	60	60
Animals	10	-	29	39
Other	-	-	-	-
<b>Total</b>	<b>27</b>	<b>3</b>	<b>237</b>	<b>267</b>

## 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
		3rd	58 858	60 800	282 930	292 856	465	6.9
2nd	Sep. 58-Sep. 59	4th	60 413	63 063	290 405	303 151	531	7.1
		5th	63 259	63 884	302 568	305 586	512	8.6
3rd	Oct. 59-Sep. 60	6th	64 057	66 961	302 926	316 629	475	9.3
		7th	68 300	66 242	317 185	307 601	473	9.4
4th	Oct. 60-Sep. 61	8th	65 567	68 277	307 903	320 603	485	9.2
		9th	69 643	58 910	332 545	281 295	492	8.8
5th	Oct. 61-Dec. 62	10th	26 075	30 684	120 753	142 102	508	9.6
		11th	21 582	21 443	99 300	99 083	509	8.6
6th	Jan. 63-Feb. 64	12th	22 764	24 003	105 260	110 988	526	8.2
		13th	23 046	22 098	107 413	102 996	610	8.0
7th	Mar. 64-Oct. 65	14th	32 623	29 827 <sup>a)</sup>	186 395	170 422	727	6.1
		15th	34 288	38 823 <sup>b)</sup>	210 665	194 338	116 <sup>c)</sup>	7.0
8th	Nov. 65-Nov. 66	16th <sup>d)</sup>	...	13 024 <sup>e)</sup>	...	58 826	118 <sup>c)</sup>	7.4
		17th	67 940	67 323	...	311 829	633	6.3
9th	Apr. 67-Nov. 67	(f)	...	10 640	...	48 812	594	7.3
		18th	72 549	66 751	340 980	327 111	546	5.5
10th	Jan. 68-Dec. 68	19th	73 229	65 867	361 972	325 927	542	5.4
		20th	73 537	68 123 <sup>g)</sup>	366 279	344 390	560	6.8
11th	Jan. 69-Dec. 69	21st	74 725	69 299 <sup>g)</sup>	374 106	350 340	554	6.4
		22nd	67 906	65 509 <sup>g)</sup>	339 810	306 594	542	6.9
12th	Jan. 70-Dec. 70	23rd	69 624	62 835 <sup>g)</sup>	342 324	305 819	557	6.9
		24th	48 651	49 653 <sup>h)</sup>	289 910	235 022	615	6.1
13th	Jan. 71-Dec. 71	25th	48 347	46 181 <sup>h)</sup>	266 013	214 152	618	6.3
		26th	45 747	45 738 <sup>i)</sup>	210 173	211 871	606	6.6
14th	Jan. 72-Dec. 72	27th	47 422	46 838 <sup>i)</sup>	211 871	215 038	550	6.8

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 sprayings with DDT. f) Emergency sprayings. g) Does not include focal sprayings. h) In addition 10 561 houses were sprayed in quarterly cycles, 4 330 emergency sprayings and 6 182 with Propoxur. i) Does not include 4 873 houses sprayed with DDT in quarterly cycles and 7 658 houses sprayed with Propoxur.



Houses to be sprayed



Houses sprayed

## EPIDEMIOLOGICAL EVALUATION OPERATIONS, ATTACK PHASE AREAS

Year	Slides examined			Species found		
	Total No.	Positive		<u>P. falciparum</u>	<u>P. vivax</u>	<u>P. malariae</u>
		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	-
1970	161 847	324	0.2	4	319	1
1971	139 440	172	0.1	7	165	-
1972	142 422	125	0.1	2	123	-

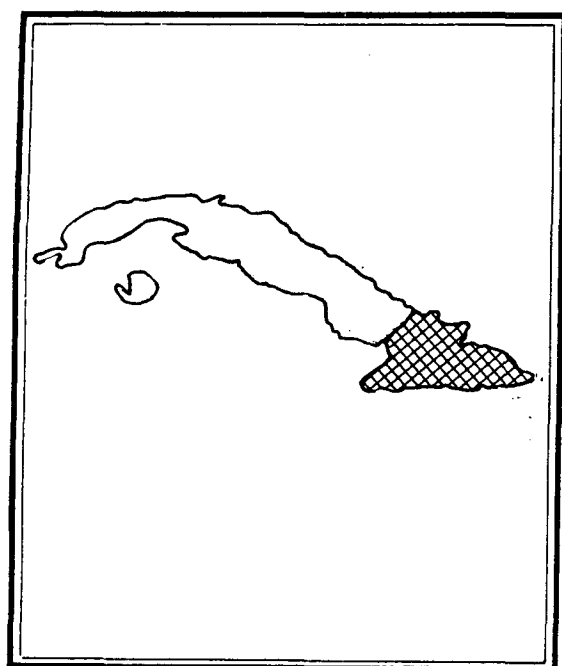
## CONSOLIDATION PHASE AREAS

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	<u>P. falciparum</u>	<u>P. vivax</u>	<u>P. malariae</u>
							from abroad	from areas within country						
1962 <sup>a)</sup>	230	52 594 <sup>a)</sup>	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	-
1970	100	33 637	33.6	26	21	-	1	1	2	-	1	1	25	-
1971	178	45 571	25.6	85	74	-	7	1	-	-	3	3	82	-
1972	188	48 730	25.9	34	9	-	5	8	-	-	12	1	33	-

a) Started in July 1962.

CUBA

## STATUS OF MALARIA PROGRAM AT DECEMBER 1972



	Population (thousands)	Area km <sup>2</sup>
TOTAL COUNTRY	8 722	114 524
Non malarious areas		77 022
Originally malarious areas		
Maintenance phase		37 502
Consolidation phase		-
Attack phase		-
Total originally malarious areas		37 502

## 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	-	-	-	-



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 <sup>a)</sup>	...	8 378	...	37 051	223	6.6
	Nov. 67-Dec. 67	12th <sup>a)</sup>	...	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.

## EPIDEMIOLOGICAL EVALUATION OPERATIONS, ATTACK PHASE AREAS a)

Year	Slides examined			Species found		
	Total No.	Positive		<u>P. falciparum</u>	<u>P. vivax</u>	<u>P. malariae</u>
		Number	Percentage			
1960 <sup>b)</sup>	28 791	1 325	4.6	197	1 128	-
1961 <sup>b)</sup>	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 <sup>c)</sup>	465 199	27	0.01	1	26	-
1967	365 239	41	0.01	10	21	10

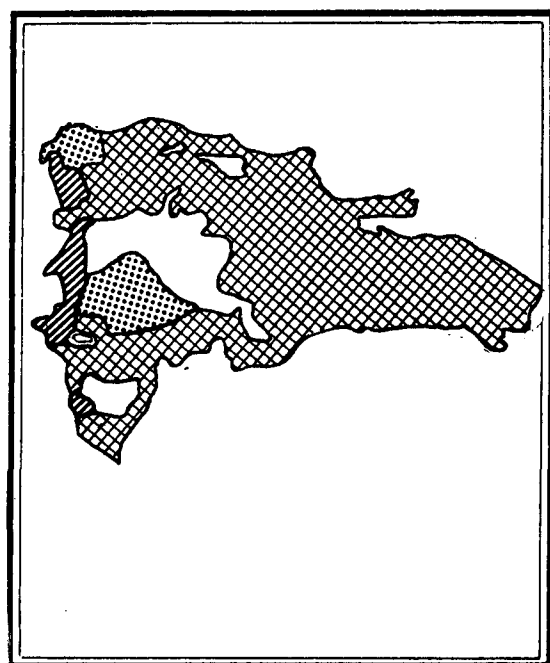
## CONSOLIDATION PHASE AREAS

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	<u>P. falciparum</u>	<u>P. vivax</u>	<u>P. malariae</u>
							from abroad	from areas within country						
1966 <sup>d)</sup>	5 488 <sup>e)</sup>	236 464 <sup>d)</sup>	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 <sup>f)</sup>	30.5	4 <sup>f)</sup>	-	-	4	-	-	-	-	-	4	-
1969	2 805	746 827 <sup>g)</sup>	26.6	3 <sup>g)</sup>	-	1	1	-	1	-	-	-	3	-
MAINTENANCE AND NON-MALARIOUS AREAS														
1970	2 857 <sup>h)</sup>	584 084	20.4	1	-	-	1	-	-	-	-	1	-	-
1971	3 058	588 185	19.2	7	-	-	7	-	-	-	-	1	6	-
1972	3 058 <sup>i)</sup>	511 753	16.7	34	-	-	34	-	-	-	-	11	23	-

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. h) Area previously in consolidation was passed to maintenance phase. i) 1971 population.

DOMINICAN REPUBLIC

## STATUS OF MALARIA PROGRAM AT DECEMBER 1972



## TOTAL COUNTRY

Population  
(thousands)      Area km<sup>2</sup>

4 371      48 442

Non malarious areas

30      880

## Originally malarious areas

Maintenance phase

3 924      38 035

Consolidation phase

310      6 490

Attack phase

107      3 037

Total originally malarious areas

4 341      47 562

## PERSONNEL

Activity	Professional	Non professional	Total
Spraying operations	1	21	22
Evaluation operations	2	229	231
Administrative and other	1	37	38
Transport	-	31	31
Total	4	318	322

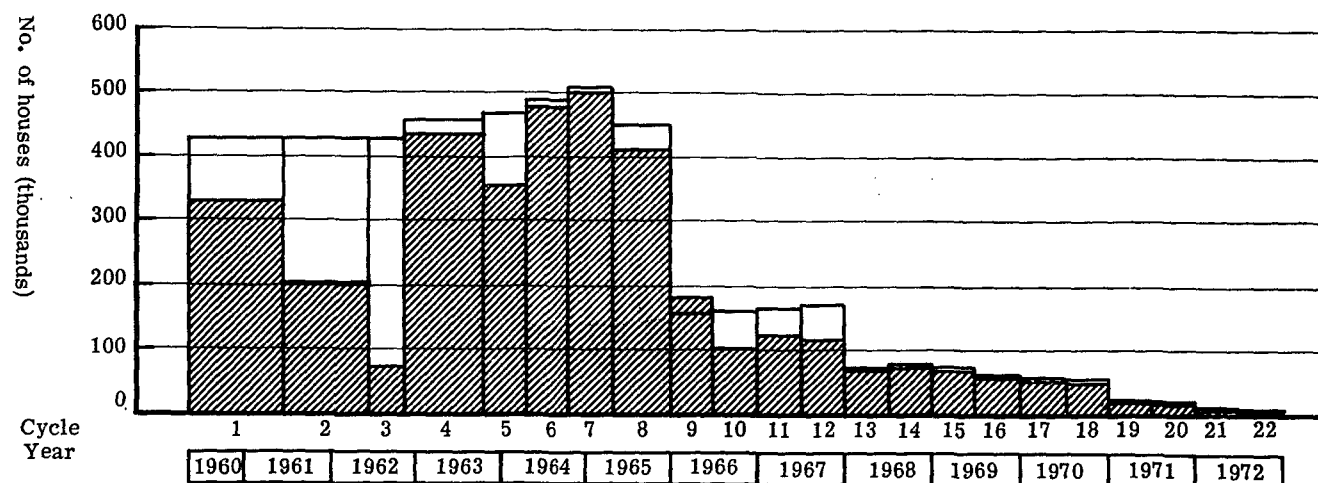
## TRANSPORT FACILITIES

Type	Spraying Operations	Evaluation Operations	Mixed or other operations	Total
Four-wheel vehicles	6	48	7	61
Two-wheel vehicles	-	136	-	136
Boats	-	-	-	-
Animals	-	65	-	65
Other	-	-	-	-
Total	6	249	7	262

## 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 <sup>a)</sup>	Mar. 60-Mar. 62	1st	428 615	332 944	-	-	-	2 206 080	1 713 612	495	9.0
(b)	Apr. 62-Oct. 62	2nd	428 615	204 531	-	-	-	2 241 656	1 083 459	472	8.4
		3rd	428 615	72 499	-	-	-	2 241 656	368 201	424	8.4
4th	Nov. 62-Mar. 64	4th	462 900	438 706	-	-	-	2 530 674	2 398 328	468	8.2
		5th	472 000	359 653	-	-	-	2 428 110	1 850 166	475	8.4
5th	Apr. 64-Mar. 65	6th	490 000	480 537	-	-	-	2 316 181	2 271 494	449	9.8
		7th	510 575	500 343	-	-	-	2 315 764	2 269 357	355	10.5
6th	Apr. 65-Jun. 66	8th	450 215	411 193	-	-	-	2 104 080	1 921 727	357	10.0
		9th	68 444	68 056	-	89 312	117 205 <sup>c)</sup>	728 974	856 077	335	10.4
7th	Jul. 66-Jun. 67	10th	72 769	77 956	-	89 312	25 548	778 783	497 333	339	9.5
		11th	80 772	78 252	-	87 038	46 259	671 240	573 884	348	10.6
8th	Jul. 67-Jun. 68	12th	83 802	80 271	-	87 038	36 622 <sup>c)</sup>	683 360	520 388	363	10.3
		13th	73 726	71 011	-	-	118 <sup>d)</sup>	346 512 <sup>e)</sup>	336 423	346	11.1
9th	Jul. 68-Jun. 69	14th	79 143	72 675	-	-	1 093 <sup>d)</sup>	371 972 <sup>e)</sup>	347 189	344	10.5
		15th	77 006	71 818	-	-	-	347 189	341 660	365	10.5
10th	Jul. 69-Jun. 70	16th	68 036	64 371	-	-	-	307 016	311 958	352	9.9
		17th	66 729	63 938	-	-	-	299 427	304 552	351	9.7
11th	Jul. 70-Jun. 71	18th	58 970	56 874	-	-	-	270 123	273 700	340	10.2
		19th	23 493	22 148	-	-	-	96 789	95 945	405	8.3
12th	Jul. 71-Jun. 72	20th	21 482	18 911	-	-	-	85 269	81 957	399	8.4
		21th	15 250	13 550	-	-	-	60 596	59 764	403	8.3
13th	Jul. 72-Dec. 72	22nd	10 768	9 528	-	-	-	43 125	42 303	429	7.3

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



□ Houses to be sprayed      ▨ Houses sprayed

## EPIDEMIOLOGICAL EVALUATION OPERATIONS, ATTACK PHASE AREAS

Year	Slides examined			Species found		
	Total No.	Positive		<u>P. falci-</u> <u>parum</u>	<u>P. vivax</u>	<u>P. malariae</u>
		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	-
1970	101 276	159	0.2	159	-	-
1971	72 921	225	0.3	225	-	-
1972	47 500	182	0.4	182	-	-

## 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	<u>P. falci-</u> <u>parum</u>	<u>P. vivax</u>	<u>P. malar-</u> <u>iae</u>
							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
1970	280	69 988	25.0	-	-	-	-	-	-	-	-	-	-	-
1971	287	55 466	19.3	2	1	-	-	-	-	-	1	2	-	-
1972	310	45 964	14.8	-	-	-	-	-	-	-	-	-	-	-

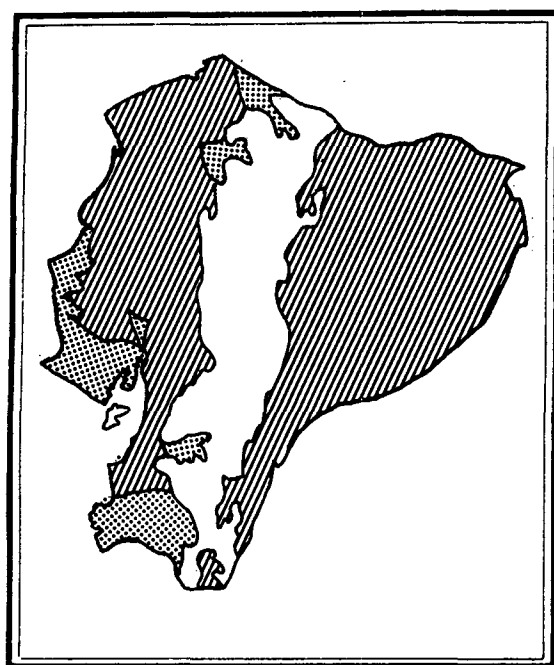
## MAINTENANCE PHASE AREAS

1968	208	55 007	26.4	3	-	1	2	-	-	-	-	2	1	-
1969	212	56 360	26.6	8	-	-	-	8	-	-	-	8	-	-
1970	3 593	456 957	12.7	2	1	-	1	-	-	-	-	2	-	-
1971	3 676	386 209	10.5	50	-	3	31	3	3	2	8	43	1	6
1972	3 924	298 858	7.6	79	3	4	70	-	-	2	-	79	-	-

a) June-December.

ECUADOR

## STATUS OF MALARIA PROGRAM AT DECEMBER 1972



	Population (thousands)	Area km <sup>2</sup>
TOTAL COUNTRY	<u>6 493</u>	<u>291 906</u>
Non malarious areas	<u>2 849</u>	<u>116 444</u>
Originally malarious areas		
Maintenance phase	<u>-</u>	<u>-</u>
Consolidation phase	<u>1 520</u>	<u>27 797</u>
Attack phase	<u>2 124</u>	<u>147 665</u>
Total originally malarious areas	<u>3 644</u>	<u>175 462</u>

## PERSONNEL

Activity	Professional	Non professional	Total
Spraying operations	3	669	672
Evaluation operations	10	183	193
Administrative and other	6	75	81
Transport	-	110	110
Total	19	1 037	1 056

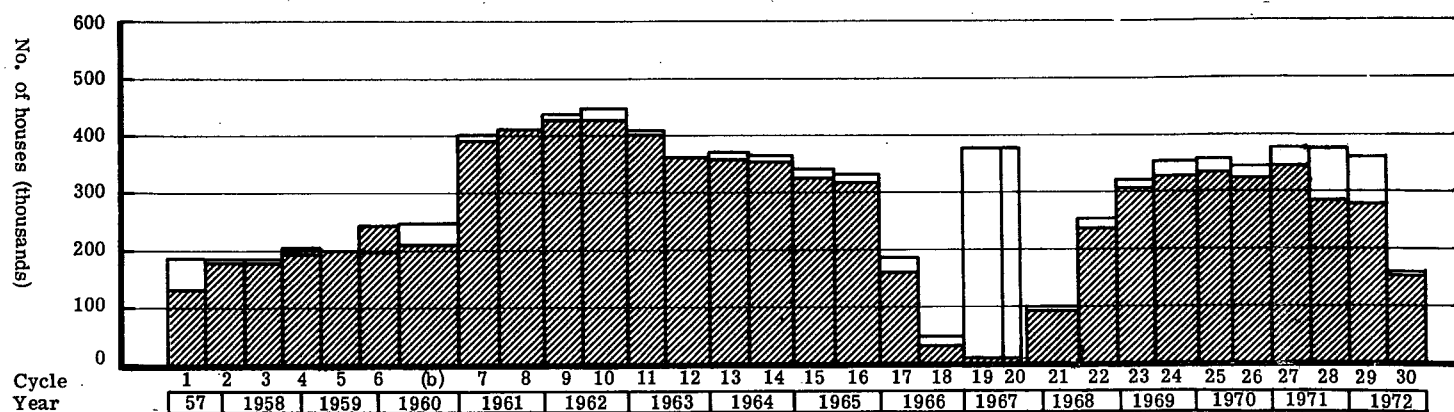
## TRANSPORT FACILITIES

Type	Spraying Operations	Evaluation Operations	Mixed or other operations	Total
Four-wheel vehicles	94	8	10	112
Two-wheel vehicles	-	67	4	71
Boats	43	8	-	51
Animals	378	10	-	388
Other	1	-	-	1
Total	516	93	14	623

## 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)			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	2 023 430 c)	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	160 889 d)	-	-	-	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	8 524 e)	-	-	-	...	43 856	519	-	6.2
		20th	375 411	6 308 e)				...	37 359	547	-	6.1
11th	Jan. 68-Jan. 69	21st	96 429	91 538 f)	-	-	-	412 868	391 841	551	-	5.8
		22nd	254 234	239 429 f)				1 247 637	1 103 686	479	-	6.8
12th	Feb. 69-Jan. 70	23rd	321 655	308 631 e)	-	-	-	1 496 262	1 405 607	573	-	7.4
		24th	352 330	339 908 e)				1 527 804	1 509 280	603	-	7.8
13th	Jan. 70-Dec. 70	25th	359 494	339 793 e)	-	-	-	1 623 163	1 563 261	605	-	7.5
		26th	346 930	328 728 e)				1 595 285	1 389 097	610	-	7.5
14th	Jan. 71-Dec. 71	27th	378 822	346 973 e)	-	-	-	1 716 064	1 571 166	638	-	7.2
		28th	377 765	283 821 e)				1 710 668	1 265 185	650	-	7.2
15th	Jan. 72-Dec. 72	29th	360 980	276 096	10.	197 132 g)	181 697 g)	1 586 310	1 222 343	652	-	7.2
		30th	160 998	153 605				713 221	654 140	640	336 g)	6.7

a) Cycle suspended. b) Emergency spraying. c) Estimated. d) Not included 21 533 supplementary house-spraying. e) Not included focal sprayings. f) Not included 39 527 houses sprayed in consolidation areas. g) Cycle of DDT - 1 g. per m<sup>2</sup>.



□ Houses to be sprayed

▨ Houses sprayed

## EPIDEMIOLOGICAL EVALUATION OPERATIONS, ATTACK PHASE AREAS

Year	Slides examined			Species found		
	Total No.	Positive		<u>P. falciparum</u>	<u>P. vivax</u>	<u>P. malariae</u>
		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	-
1967a)	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
1970	218 663	24 076	11.0	2 571	21 497	8
1971	170 848	8 481	5.0	881 <sup>b)</sup>	7 599	1
1972	214 347	6 226	2.9	711 <sup>b)</sup>	5 515	-

## CONSOLIDATION PHASE AREAS

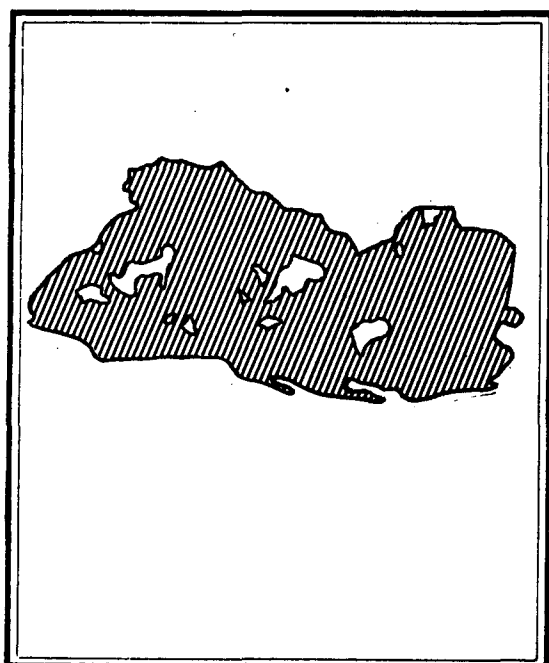
Year	Estimated population in the area (thousands)	No. of slides examined	% of population sampled (annual rate)	Total No. of positive cases	Origin of infections							Species of parasite		
					Autochthonous	Relapsing	Imported		Induced	Introduced	Not investigated and unclassified	<u>P. falciparum</u>	<u>P. vivax</u>	<u>P. malariae</u>
							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	-
1967a)	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	-
1970	1 286	142 216	11.1	4 299	318	75	3	948	-	52	2 903	257	4 042	-
1971	1 325	112 266	8.5	690	145	-	1	297	-	8	239 <sup>c)</sup>	28 <sup>b)</sup>	662	-
1972	1 520	107 264	7.1	483	113	1	-	152	-	12	205	16 <sup>b)</sup>	466	-

a) Figures for November not separated by phase. b) Includes mixed infections. c) Includes cryptic cases.



EL SALVADOR

## STATUS OF MALARIA PROGRAM AT DECEMBER 1972



	Population (thousands)	Area km <sup>2</sup>
<b>TOTAL COUNTRY</b>	<b>3 772</b>	<b>21 149</b>
Non malarious areas	561	2 494
Originally malarious areas		
Maintenance phase	-	-
Consolidation phase	-	-
Attack phase	3 211	18 655
<b>Total originally malarious areas</b>	<b>3 211</b>	<b>18 655</b>

## PERSONNEL

Activity	Professional	Non professional	Total
Spraying operations	1	358	359
Evaluation operations	6	156	162
Administrative and other	1	47	48
Transport	-	81	81
<b>Total</b>	<b>8</b>	<b>642</b>	<b>650</b>

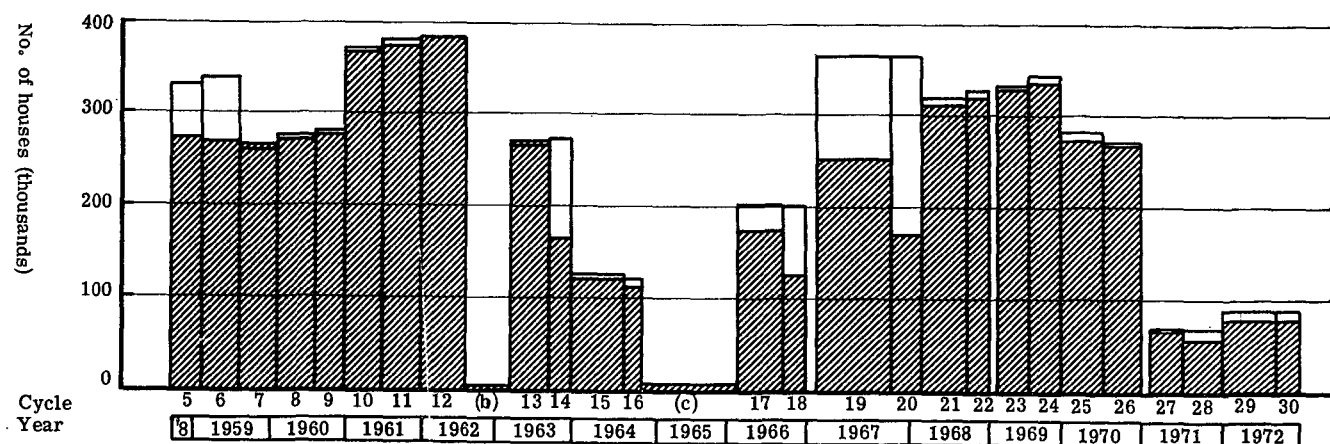
## TRANSPORT FACILITIES

Type	Spraying Operations	Evaluation Operations	Mixed or other operations	Total
Four-wheel vehicles	56	20	9	85
Two-wheel vehicles	-	90	28	118
Boats	7	-	-	7
Animals	-	-	-	-
Other	2	2	3	7
<b>Total</b>	<b>65</b>	<b>112</b>	<b>40</b>	<b>217</b>

## 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			Propoxur							
		Cycle	Planned	Sprayed	Cycle	Planned	Sprayed	Planned	Protected	DDT	Propoxur	
3rd	Aug. 58-Jul. 59 <sup>a</sup>	5th	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-Ene.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
13th	Jan. 70-Dec.70	25th	283 480	273 886	1st	16 832	16 151	1 361 790	1 332 517	458	270	10.1
		26th	269 983	264 597	2nd	16 655	15 707	1 312 696	1 309 710	450	277	10.3
14th	Mar.71-Dec.71	27th	69 344	68 004	1st	45 757	43 058	323 981	316 765	450	292	10.0
		28th	69 082	56 104	2nd	46 072	43 738	323 981	254 388	453	319	10.3
					3rd	46 072	16 764				339	
15th	Jan. 72-Dec.72	29th	91 600	89 051	4th-5th	123 042	118 519d)	435 644	426 143	472	346	9.9
		30th	91 600	89 438	6th-7th	123 042	124 838d)	435 644	426 630	476	345	10.8

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. d) In addition 298 746 houses were partially sprayed with Propoxur.



□ Houses to be sprayed  
 ▨ Houses sprayed

## EPIDEMIOLOGICAL EVALUATION OPERATIONS, ATTACK PHASE AREAS

Year	Slides examined			Species found		
	Total No.	Positive		<u>P. falciparum</u> a)	<u>P. vivax</u>	<u>P. malariae</u>
		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	-
1970	572 373	45 436	7.9	4 202	41 234	-
1971	414 331	46 858	11.3	3 234	43 623	1
1972	394 935	38 335	9.7	3 059	35 276	-

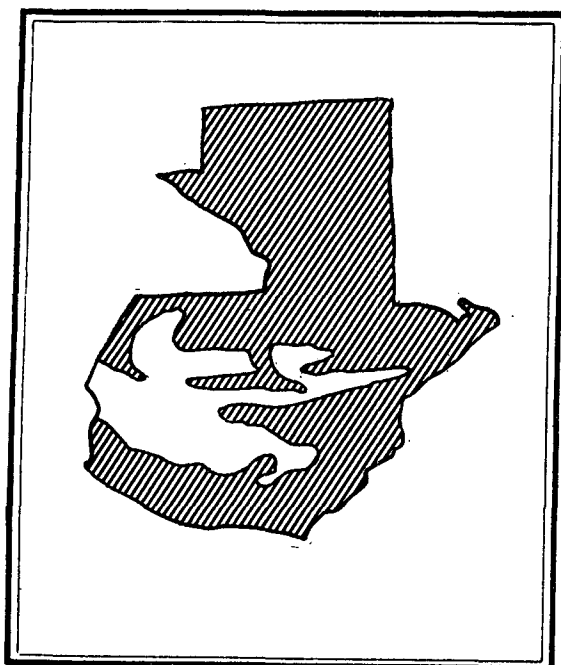
## CONSOLIDATION PHASE AREAS

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	<u>P. falciparum</u>	<u>P. vivax</u>	<u>P. malariae</u>
							from abroad	from areas within country						
1968 <sup>b)</sup>	505 <sup>b)</sup>	112 640	22.3	4 305	487	592	47	773	-	-	2 406	55	4 250	-

a) Includes mixed infections. b) Beginning 1969 this area was brought to attack phase.

GUATEMALA

## STATUS OF MALARIA PROGRAM AT DECEMBER 1972



	Population (thousands)	Area km <sup>2</sup>
<b>TOTAL COUNTRY</b>	<u>5 604</u>	<u>108 889</u>
Non malarious areas	<u>3 517</u>	<u>28 539</u>
Originally malarious areas		
Maintenance phase	<u>-</u>	<u>-</u>
Consolidation phase	<u>-</u>	<u>-</u>
Attack phase	<u>2 087</u>	<u>80 350</u>
<b>Total originally malarious areas</b>	<u>2 087</u>	<u>80 350</u>

## PERSONNEL

Activity	Professional	Non professional	Total
Spraying operations	1	469	470
Evaluation operations	5	204	209
Administrative and other	1	81	82
Transport	-	60	60
<b>Total</b>	<b>7</b>	<b>814</b>	<b>821</b>

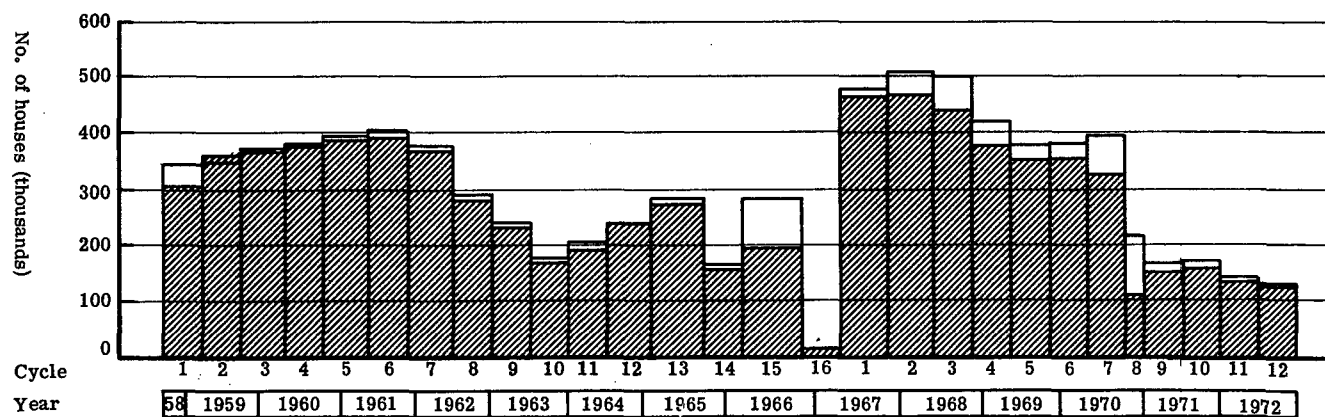
## TRANSPORT FACILITIES

Type	Spraying Operations	Evaluation Operations	Mixed or other operations	Total
Four-wheel vehicles	57	5	41	103
Two-wheel vehicles	-	146	1	147
Boats	2	3	12	17
Animals	-	-	10	10
Other	-	-	8	8
<b>Total</b>	<b>59</b>	<b>154</b>	<b>72</b>	<b>285</b>

## 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			Propoxur							
		Cycle	Planned	Sprayed	Cycle	Planned	Sprayed	Planned	Protected	DDT	Propoxur	
3rd <sup>a)</sup>	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 <sup>b)</sup>				1 067 260	1 019 937	506		8.2
		14th	165 071	162 100 <sup>c)</sup>				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	1st <sup>d)</sup>	478 038	468 963				1 912 152	1 778 666	550		7.7
		2nd	511 193	467 976				1 891 414	1 793 133	531		7.8
12th	Apr. 68-Mar. 69	3rd	500 444	443 408				1 814 885	1 727 243	545		7.7
		4th	416 861	378 313				1 499 045	1 439 806	544		7.6
13th	Apr. 69-Mar. 70	5th	379 477	350 848				1 346 643	1 354 349	535		7.7
		6th	382 532	352 988				1 348 215	1 321 466	540		7.7
14th	Apr. 70-Dec. 70	7th	397 810	326 349				1 311 312	1 197 406	529		7.8
		8th	216 798	110 575 <sup>e)</sup>				721 685	360 346	497		7.8
15th	Jan. 71-Dec. 71	9th	166 365	151 520	1st	56 338	49 078	549 680	530 588 <sup>f)</sup>	507	225	7.8
		10th	167 440	158 800	2nd	61 941	57 674	543 661	543 664	507	242	7.8
					3rd	60 783	59 071				232	
16th	Jan. 72-Dec. 72	11th	144 441	131 994 <sup>g)</sup>	4th-5th	128 722	124 295	488 851	473 234 <sup>f)</sup>	490	251	7.5
		12th	140 956	132 771 <sup>g)</sup>	6th-7th	140 195	134 503	470 640	471 528 <sup>f)</sup>	487	256	7.4

a) Previous coverage with dieldrin. b) 115 204 houses were sprayed in annual cycles and 3 908 in emergency sprayings. c) Includes 5 791 houses sprayed in emergency sprayings. d) First cycle of 3-Year Plan. e) Includes 8 197 houses sprayed in two quarterly cycles. f) Does not include population protected with Propoxur. g) In addition 60 695 houses were sprayed with DDT in four quarterly cycles.



GUATEMALA (Cont.)

## EPIDEMIOLOGICAL EVALUATION OPERATIONS, ATTACK PHASE AREAS

Year	Slides examined			Species found		
	Total No.	Positive		<u>P. falciparum</u>	<u>P. vivax</u>	<u>P. malariae</u>
		Number	Percentage			
1956a)	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	191 795	11 810	6.2	4 529	7 244	37
1964	165 263	16 981	10.3	4 255	12 693	33
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
1970	447 706	11 044	2.5	81	10 963	-
1971	332 531	8 280	2.5	33	8 246	1
1972	345 156	7 750	2.2	4	7 746	-

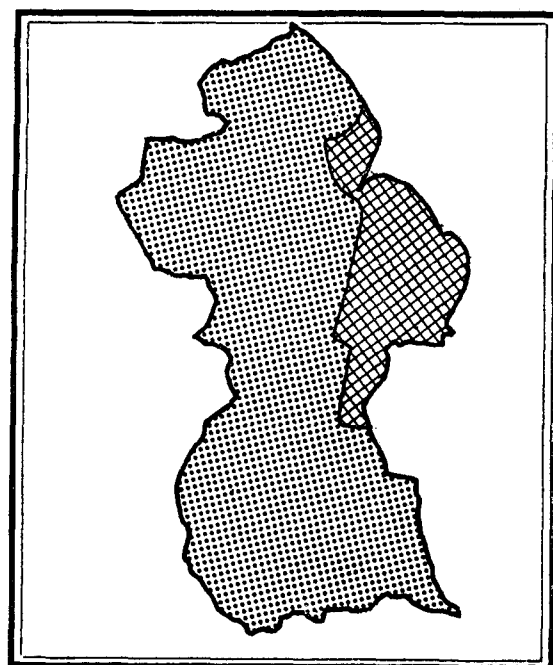
## CONSOLIDATION PHASE AREAS

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	<u>P. falciparum</u>	<u>P. vivax</u>	<u>P. malariae</u>
							from abroad	from areas within country						
1962	581	48 370	8.3	213	2	-	-	100	-	-	111	62	151	-
1963	1 234	157 071	12.7	3 306	178	142	-	554	-	2	2 430	1 028	2 266	12
1964	1 057	123 795	11.9	3 420	154	335	-	511	-	1	2 419	748	2 665	7
1965	887	138 550	15.6	2 742	296	272	-	111	-	-	2 063	260	2 481	1
1966 <sup>b)</sup>	845	24 393 <sup>c)</sup>	11.5	674	81	29	1	9	-	-	554	38	636	-

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

GUYANA

## STATUS OF MALARIA PROGRAM AT DECEMBER 1972



	Population (thousands)	Area km <sup>2</sup>
TOTAL COUNTRY	<u>757</u>	<u>215 025</u>
Non malarious areas	<u>-</u>	<u>-</u>
Originally malarious areas		
Maintenance phase	<u>711</u>	<u>39 437</u>
Consolidation phase	<u>46</u>	<u>175 588</u>
Attack phase	<u>-</u>	<u>-</u>
Total originally malarious areas	<u>757</u>	<u>215 025</u>

## PERSONNEL

Activity	Professional	Non professional	Total
Spraying operations	-	7 (7)	7 (7)
Evaluation operations	(2)	60	60 (2)
Administrative and other	-	15	15
Transport	-	21	21
Total	(2)	103 (7)	103 (9)

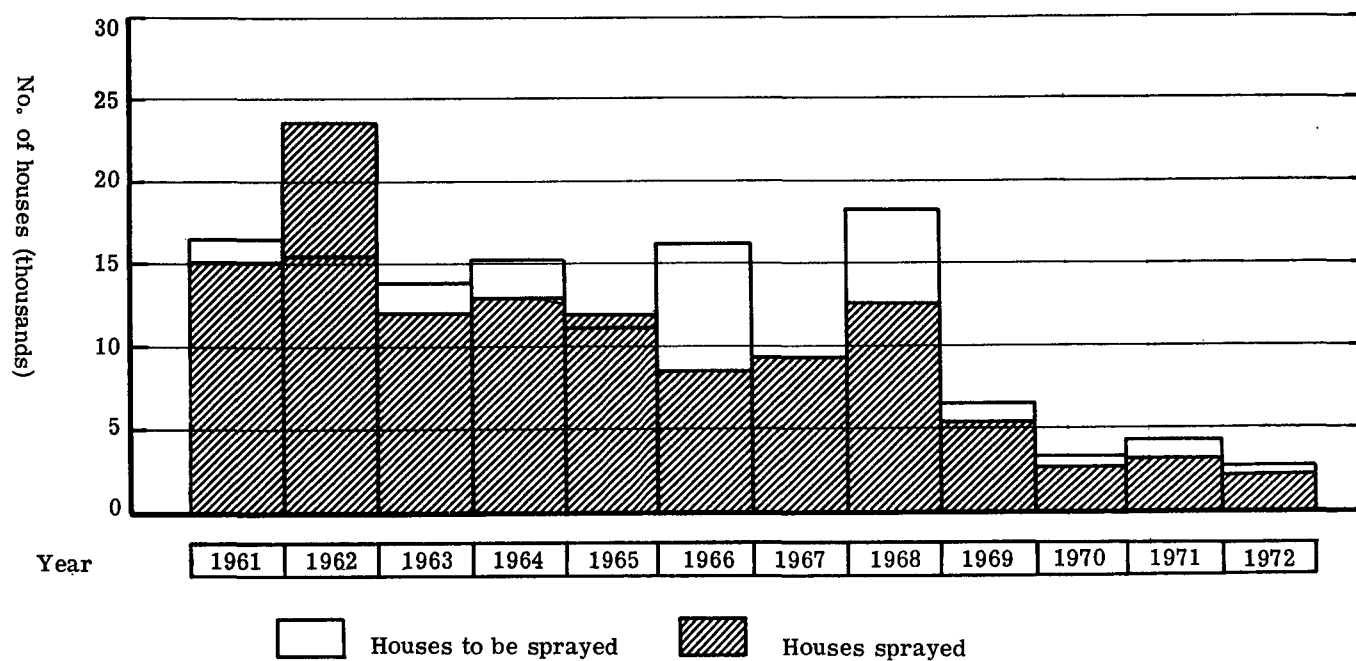
## TRANSPORT FACILITIES

Type	Spraying Operations	Evaluation Operations	Mixed or other operations	Total
Four-wheel vehicles	-	6	3	9
Two-wheel vehicles	-	7	-	7
Boats	-	11	1	12
Animals	-	9	-	9
Other	-	-	-	-
Total	-	33	4	37

(Part-time personnel in parentheses)

## 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	5 280	63 243	54 986	295	4.3
...	Jan. 65-Dec. 65	...	6 358	4 361	...	4 236	2 384				
...	Jan. 65-Dec. 65	...	6 358	4 361	...	2 341	2 759	46 000	47 467	227	4.6
...	Feb. 66-Dec. 66	...	8 217	718	...	2 341	4 001				
...	Feb. 66-Dec. 66	...	8 217	718	...	3 889	4 833	70 362	36 256	461	4.3
...	Feb. 67-Dec. 67	...	-	-	...	4 619	3 067				
...	Feb. 67-Dec. 67	...	-	-	...	...	5 075	...	20 972	318	6.2
...	Jan. 68-Dec. 68	-	-	-	...	...	4 167	...	18 192		
...	Jan. 68-Dec. 68	-	-	-	...	12 304	7 094	35 053	35 053	199	6.5
...	Feb. 69-Dec. 69	-	-	-	...	5 979	5 414	27 723	22 606		
...	Feb. 69-Dec. 69	-	-	-	...	6 542	5 477	32 033	22 971	310	5.8
...	Feb. 70-Dec. 70	-	3 267	2 883	-	-	-	38 674	11 063	234	5.6
...	Feb. 71-Dec. 71	-	4 500	3 049	-	-	-	14 400	13 011	300	5.7
...	Feb. 72-Dec. 72	-	2 675	2 135	-	3 760	2 635	15 460	11 144	285	7.4





## EPIDEMIOLOGICAL EVALUATION OPERATIONS, ATTACK PHASE AREAS

Year	Slides examined			Species found		
	Total No.	Positive		<u>P. falciparum</u>	<u>P. vivax</u>	<u>P. malariae</u>
		Number	Percentage			
1958	1 520	51	3.36	23	8	20
1959	3 754	176a)	4.69	53	100	13
1960	3 674	263a)	7.16	175	67	12
1961	15 515	218	1.41	57	156	5
1962	14 358	425	2.96	266	159	-
1963	16 780	473a)	2.82	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	12	0.03	12	-	-

## 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	<u>P. falciparum</u>	<u>P. vivax</u>	<u>P. malariae</u>
							from abroad	from areas within country						
1965	26	15 500	59.6	1	1	-	-	-	-	-	-	-	1	-
1966	30	22 141	73.8	882	...	...	...	...	...	...	...	-	882	-
1970 <sup>b)</sup>	43	45 986	107.0	17	-	-	15	-	-	-	2	9	8	-
1971	44	51 138	116.2	26	11	-	12	-	-	13	-	17	8	1
1972	46	51 632	112.2	263	230	-	23	-	-	10	-	145	118	-

## 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	22 155	3.3	7	-	-	1	6	-	-	-	1	6	-
1970	671	17 637	2.6	1	-	-	-	-	-	-	1	-	1	-
1971	691	14 829	2.1	1	-	-	-	-	-	-	-	-	1	-
1972	711	8 299	1.2	3	-	-	2	-	-	-	1	2	1	-

a) Includes undifferentiated mixed infections. b) The area previously in attack was passed to consolidation in 1970.

HAITI

## STATUS OF MALARIA PROGRAM AT DECEMBER 1972



	Population (thousands)	Area km <sup>2</sup>
TOTAL COUNTRY	5 090	27 750
Non malarious areas	1 340	8 650
Originally malarious areas		
Maintenance phase	-	-
Consolidation phase	-	-
Attack phase	3 750	19 100
Total originally malarious areas	3 750	19 100

## PERSONNEL

Activity	Professional	Non professional	Total
Spraying operations	2	916	918
Evaluation operations	10	288	298
Administrative and other	3	38	41
Transport	-	55	55
Total	15	1 297	1 312

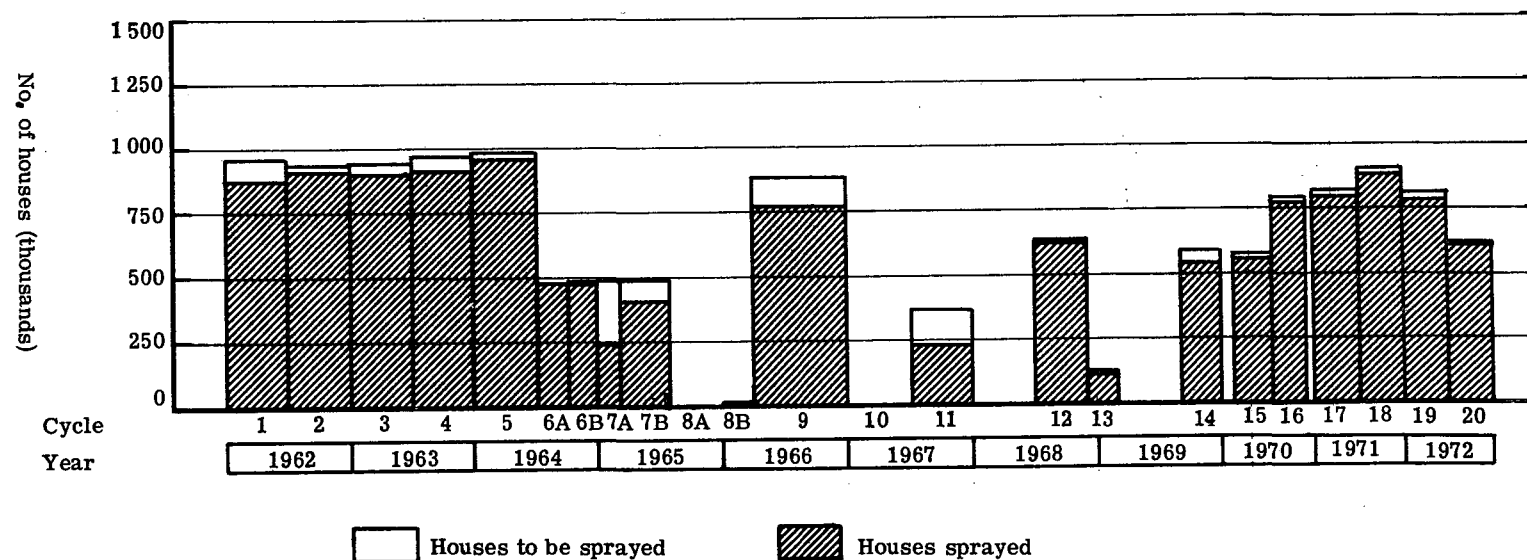
## TRANSPORT FACILITIES

Type	Spraying Operations	Evaluation Operations	Mixed or other operations	Total
Four-wheel vehicles	-	-	168	168
Two-wheel vehicles	-	-	-	-
Boats	-	-	1	1
Animals	-	-	-	-
Other	-	-	-	-
Total	-	-	169	169

## 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 <sup>a)</sup>	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 <sup>b)</sup>	457 066	454 029	1 459 549	1 449 893	127	16.8
		6th B <sup>b)</sup>	465 260	455 353	1 446 450	1 446 458	122	17.5
		7th A <sup>b)</sup>	465 907	246 414	1 447 900	765 795	119	18.3
4th	Jan. 65-Jan. 66	7th B <sup>c)</sup>	465 907	404 692	1 477 205	1 283 123	234	17.9
		8th A <sup>d)</sup>	5 657	5 418	21 175	20 280	487	9.9
		8th B <sup>d)</sup>	8 178	8 048	27 951	27 508	254	14.2
		9th	865 000	772 513	2 881 920	2 573 852	237	14.8
5th	Feb. 66-Dec. 66	11th	360 049	233 513	...	720 525	295	15.8
6th	Jul. 67-Dec. 67	12th	647 728	639 266	2 452 000	2 188 271	258	14.8
7th	Jul. 68-Jan. 69	13th	124 814	121 119	452 000	271 305	234	16.6
8th	Aug. 69-Dec. 69	14th	595 000	549 869	1 617 000	1 685 059	294	15.2
9th	Feb. 70-Nov. 70	15th	579 818	576 927	1 637 552	1 687 667	277	15.5
		16th	799 818	777 773	2 162 437	2 330 412	270	14.5
10th	Jan. 71-Dec. 71	17th	819 368	801 865	2 318 630	2 246 558	270	13.8
		18th A	83 353	80 626	200 885	204 444	246	14.5
		18th B	819 368	814 696	2 325 795	2 278 253	265	13.6
11th	Jan. 72-Dec. 72	19th	841 613	807 258	2 427 205	2 330 036	274	13.9
		20th	620 267	603 769	1 764 504	1 764 504	277	13.7

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



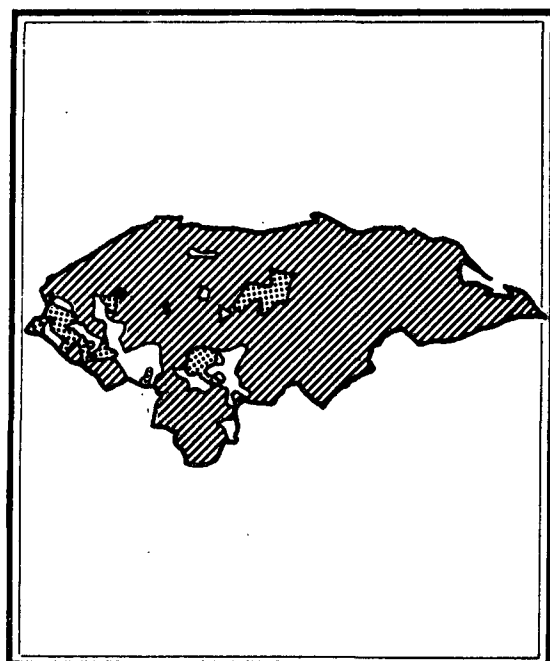
HAITI (Cont. )

## EPIDEMIOLOGICAL EVALUATION OPERATIONS, ATTACK PHASE AREAS

Year	Slides examined			Species found		
	Total No.	Positive		<u>P. falciparum</u>	<u>P. vivax</u>	<u>P. malariae</u>
		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
1970	357 366	10 658	3.0	10 654	-	4
1971	270 695	11 347	4.2	11 345	2	-
1972	289 145	19 060	6.6	19 060	-	-

HONDURAS

## STATUS OF MALARIA PROGRAM AT DECEMBER 1972



	Population (thousands)	Area km <sup>2</sup>
TOTAL COUNTRY	2 653	112 088
Non malarious areas	338	10 737
Originally malarious areas		
Maintenance phase	-	-
Consolidation phase	451	7 123
Attack phase	1 864	94 228
Total originally malarious areas	2 315	101 351

## PERSONNEL

Activity	Professional	Non professional	Total
Spraying operations	-	244	244
Evaluation operations	4	104	108
Administrative and other	1	25	26
Transport	-	40	40
Total	5	413	418

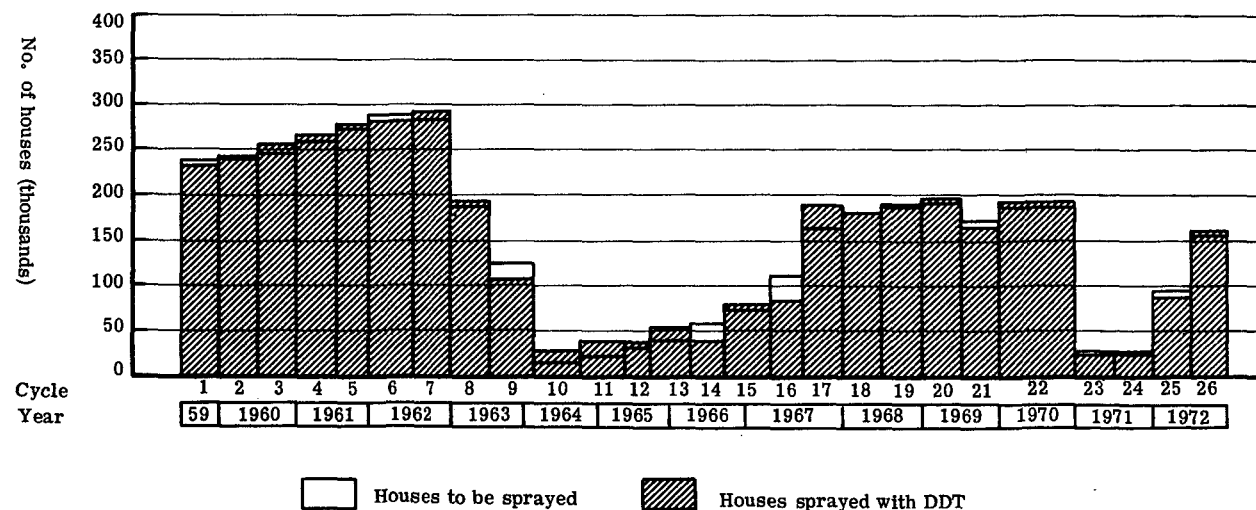
## TRANSPORT FACILITIES

Type	Spraying Operations	Evaluation Operations	Mixed or other operations	Total
Four-wheel vehicles	42	10	21	73
Two-wheel vehicles	-	70	1	71
Boats	-	-	-	-
Animals	24	66	-	90
Other	-	-	-	-
Total	66	156	22	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	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
		10th	14 851	27 719	2nd	17 471	18 286				343	
					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
		12th	30 377	35 603	5th	22 039	24 997				411	
					-	-	-	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	189 587				806 510	1 015 546	500	-	7.4
		18th	181 273	181 190	-	-	3 957 <sup>a)</sup>	891 863	891 903	475	-	8.5
10th	Jul. 68-Jun. 69	19th	186 143	186 861			10 060 <sup>a)</sup>	915 823	918 403	482	-	8.5
		20th	191 937	195 462	-	-	6 109 <sup>a)</sup>	977 310	932 976	449	-	8.1
11th	Jul. 69-Dec. 69	21st	171 288	164 954	-	-	8 670 <sup>a)</sup>	856 440	795 210	349	-	8.0
12th	Jan. 70-Dec. 70	22nd	190 386	191 383 <sup>b)</sup>	-	44 706	48 673 <sup>c)</sup>	951 930	928 051	401	-	7.8
13th	Jan. 71-Dec. 71	23rd	22 997	22 479	1st- 4th	107 641	104 641 <sup>d)</sup>	111 108	108 752 <sup>e)</sup>	419	-	8.8
		24th	22 900	23 416				110 752	113 180 <sup>e)</sup>	391	-	9.7
14th	Jan. 72-Dec. 72	25th	93 575	89 493 <sup>f)</sup>	5th-6th	142 226	137 032 <sup>d)</sup>	451 493 <sup>f)</sup>	461 392 <sup>f)</sup>	412	-	8.1
		26th	155 709	158 367 <sup>g)</sup>				748 497 <sup>g)</sup>	781 962 <sup>g)</sup>	404	-	9.3

a) Emergency spraying with DDT. b) Does not include 8 394 emergency sprayings. c) Two quarterly cycles with DDT. d) Total houses sprayed in four quarterly cycles with Propoxur. e) 538 631 inhabitants were protected with sprayings of Propoxur. f) Includes 44 881 houses sprayed in two quarterly cycles. g) Includes 87 118 houses sprayed in one cycle from April/December and 25 053 in semestrial cycle in "Valle de Sula".



## EPIDEMIOLOGICAL EVALUATION OPERATIONS, ATTACK PHASE AREAS

Year	Slides examined			Species found		
	Total No.	Positive		<u>P. falci-</u> <u>parum</u> a)	<u>P. vivax</u>	<u>P. malariae</u>
		Number	Percentage			
1958 b)	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	-
1970	321 763	33 926	10.5	5 534	28 392	-
1971	237 398	47 913	20.2	4 358	43 555	-
1972	206 203	18 381	8.9	587	17 794	-

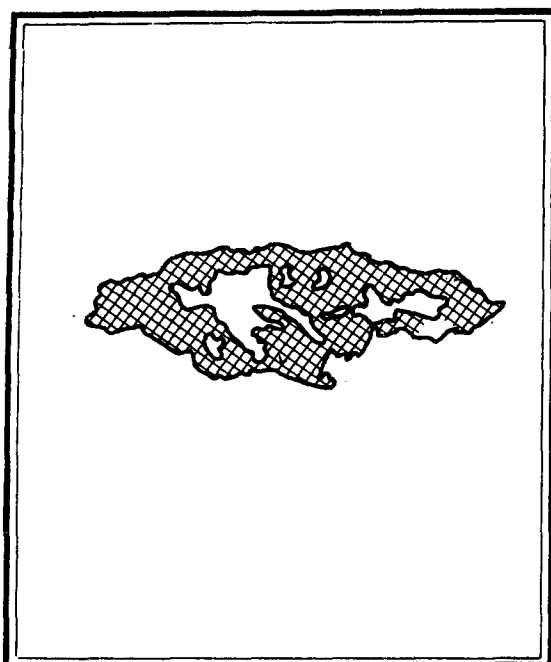
## CONSOLIDATION PHASE AREAS

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	<u>P. falci-</u> <u>parum</u> (a)	<u>P. vivax</u>	<u>P. malariae</u>
							from abroad	from areas within country						
1962 c)	46	9 989 c)	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	-
1970	423	35 673	8.4	611	181	23	-	147	-	-	260	71	540	-
1971	437	18 375	4.2	673	59	93	-	181	2	-	338	86	587	-
1972	451	20 376	4.1	270	40	28	2	46	-	-	154	65	205	-

a) Includes mixed infections. b) Incomplete information. c) July-december.

JAMAICA

## STATUS OF MALARIA PROGRAM AT DECEMBER 1972



## TOTAL COUNTRY

Population  
(thousands)Area km<sup>2</sup>

1 911 11 428

Non malarious areas

382 1 400

## Originally malarious areas

Maintenance phase

1 529 10 028

Consolidation phase

- -

Attack phase

- -

Total originally malarious areas 1 529 10 028

## PERSONNEL

Activity	Professional	Non professional	Total
Spraying operations	-	-	-
Evaluation operations	13	37	50
Administrative and other	1	15	16
Transport	-	9	9
Total	14	61	75

## TRANSPORT FACILITIES

Type	Spraying Operations	Evaluation Operations	Mixed or other operations	Total
Four-wheel vehicles	-	15	-	15
Two-wheel vehicles	-	-	-	-
Boats	-	-	-	-
Animals	-	-	-	-
Other	-	-	-	15
Total	-	15	-	15



## EPIDEMIOLOGICAL EVALUATION OPERATIONS, ATTACK PHASE AREAS

Year	Slides examined			Species found		
	Total No.	Positive		<u>P. falciparum</u>	<u>P. vivax</u>	<u>P. malariae</u>
		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	<u>P. falciparum</u>	<u>P. vivax</u>	<u>P. malariae</u>
							from abroad	from areas within country						
1960 <sup>a)</sup>	313	48 411 <sup>a)</sup>	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 <sup>b)</sup>	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	-	-	-	-	-	-	-	-	-	-
1970	1 861	39 817	2.1	2	-	-	2	-	-	-	-	2	-	-
1971	1 861	32 170	1.7	0	-	-	-	-	-	-	-	-	-	-
1972	1 529 <sup>c)</sup>	29 028	1.9	1	-	-	1	-	-	-	-	-	1	-

a) Consolidation phase began in July 1960. b) January-March. c) 1971 population provided by country.

MEXICO

## STATUS OF MALARIA PROGRAM AT DECEMBER 1972



	Population (thousands)	Area km <sup>2</sup>
TOTAL COUNTRY	<u>50 982</u>	<u>1 967 183</u>
Non malarious areas	<u>25 430</u>	<u>817 183</u>
Originally malarious areas		
Maintenance phase	<u>-</u>	<u>-</u>
Consolidation phase	<u>11 866</u>	<u>424 694</u>
Attack phase	<u>13 686</u>	<u>725 306</u>
Total originally malarious areas	<u>25 552</u>	<u>1 150 000</u>

## PERSONNEL

Activity	Professional	Non professional	Total
Spraying operations	46	3 668	3 714
Evaluation operations	63	1 091	1 154
Administrative and other	14	620	634
Transport	-	246	246
Total	123	5 625	5 748

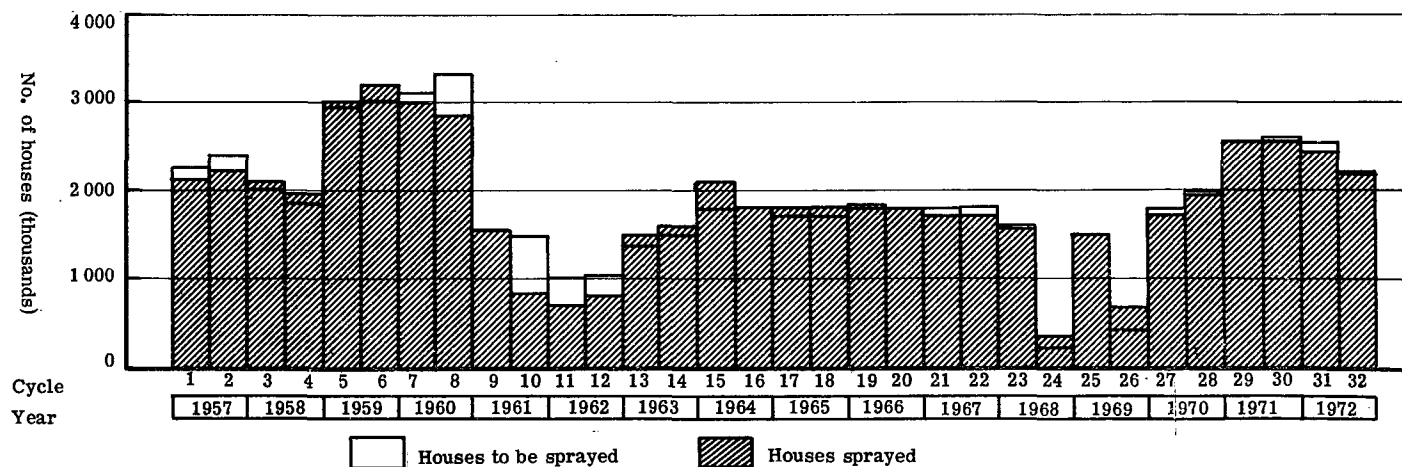
## TRANSPORT FACILITIES

Type	Spraying Operations	Evaluation Operations	Mixed or other operations	Total
Four-wheel vehicles	1 260	-	68	1 328
Two-wheel vehicles	-	-	-	-
Boats	52	-	-	52
Animals	2 201	215	-	2 416
Other	-	-	-	-
Total	3 513	215	68	3 796

## 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
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
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
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 <sup>b)</sup>	-	-	-	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 <sup>b)</sup>	-	-	-	5 686 547	5 969 938	512	-	8.6
		14th	1 477 793	1 606 125 <sup>b)</sup>			5 572 757	6 056 473	...	8.7		
8th	Jan. 64-Dec. 64	15th	1 808 906	2 190 136 <sup>c)</sup>	-	-	-	6 869 682	8 317 653	486	-	8.7
		16th	1 808 906	1 848 155 <sup>c)</sup>			6 770 916	6 917 988	476	8.7		
9th	Jan. 65-Dec. 65	17th	1 770 934	1 824 675 <sup>c)</sup>	-	-	-	6 278 670	6 469 365	423	-	9.4
		18th	1 770 934	1 812 043 <sup>c)</sup>			5 949 098	6 087 346	408	9.3		
10th	Jan. 66-Dec. 66	19th	1 842 180	1 874 530 <sup>d)</sup>	-	-	-	6 482 447	6 596 302	420	-	9.4
		20th	1 842 180	1 839 992 <sup>d)</sup>			6 202 620	6 195 335	410	9.1		
11th	Jan. 67-Dec. 67	21st	1 814 243	1 781 299 <sup>d)</sup>	-	-	-	6 350 024	6 586 286	407	-	9.2
		22nd	1 814 243	1 734 073 <sup>d)</sup>			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 <sup>e)</sup>	-	-	-	5 685 501	5 028 887	482	-	9.3
		26th	407 363	609 871 <sup>e)</sup>			1 544 842	1 415 511	551	8.6		
14th	Jan. 70-Dec. 70	27th	1 791 048	1 735 041 <sup>f)</sup>	-	-	-	8 955 240	6 742 946	555	-	9.1
		28th	1 991 000	1 931 014 <sup>f)</sup>			7 763 460	7 570 041	574	8.7		
15th	Jan. 71-Dec. 71	29th	2 502 750	2 505 614	1st-3rd <sup>g)</sup>	275 572 <sup>g)</sup>	277 719 <sup>g)</sup>	10 105 493	10 118 755	460	-	8.4
		30th	2 575 269	2 567 322			10 167 400	10 174 222	463	8.5		
16th	Jan. 72-Dec. 72	31st	2 503 233	2 433 735	1st-3rd <sup>g)</sup>	270 940 <sup>g)</sup>	269 671 <sup>g)</sup>	9 893 648	9 619 472	521	391 <sup>g)</sup>	8.3
		32nd	2 256 367	2 261 792			8 803 242	8 825 326	524	8.3		

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. f) Does not include 5 803 houses sprayed and 23 036 inhabitants from Zone V. g) Three 4-months cycles.



## EPIDEMIOLOGICAL EVALUATION OPERATIONS, ATTACK PHASE AREAS

Year	Slides examined			Species found		
	Total No.	Positive		<u>P. falciparum</u> a)	<u>P. vivax</u>	<u>P. malariae</u>
		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 888b)	10 054b)	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
1970	1 322 628	57 435	4.34	3 018	54 374	43
1971	2 218 232	41 167	1.85	1 500	39 627	40
1972	1 829 488	25 537	1.40	850	24 653	34

## CONSOLIDATION PHASE AREAS

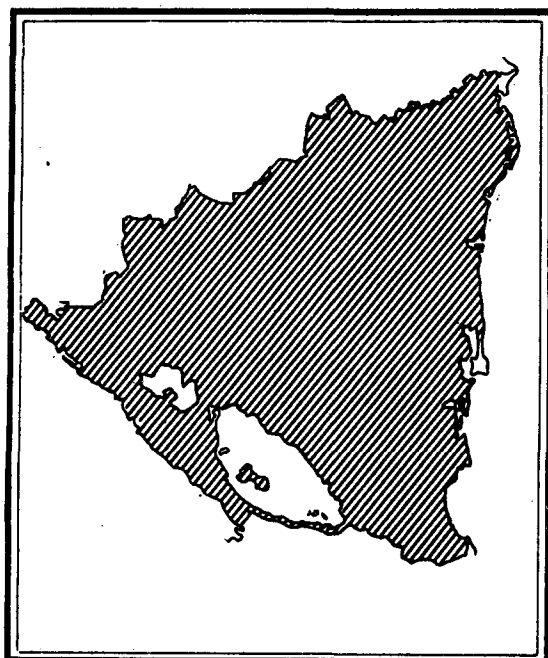
Year	Estimated population in the area (thousands)	No. of slides examined	% of population sampled (annual rate)	Total No. of positive cases	Origin of infections							Species of parasite		
					Autochthonous	Relapsing	Imported		Induced	Introduced	Not investigated and unclassified	<u>P. falciparum</u>	<u>P. vivax</u>	<u>P. malariae</u>
							from abroad	from areas within country						
1958	59	4 449	7.5	-	-	-	-	-	-	-	-	-	-	-
1959	59	6 560	11.1	-	-	-	-	-	-	-	-	-	-	-
1960 c)	70	4 058 c)	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
1970	11 226	567 249	5.0	3 723	966	207	1	316	7	4	2 222	8	3 709	6
1971	11 260	641 021	5.7	1 811	915	290	-	378	12	2	214	1	1 805	5
1972	11 866	500 179	4.2	679	330	117	1	183	8	4	36	2	671	6

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

b) January-September.

NICARAGUA

## STATUS OF MALARIA PROGRAM AT DECEMBER 1972



## TOTAL COUNTRY

Population  
(thousands)      Area km<sup>2</sup>

1965      127 358

Non malarious areas

-      9 000

## Originally malarious areas

Maintenance phase

-      -

Consolidation phase

-      -

Attack phase

1965      118 358

Total originally malarious areas      1965      118 358

## PERSONNEL

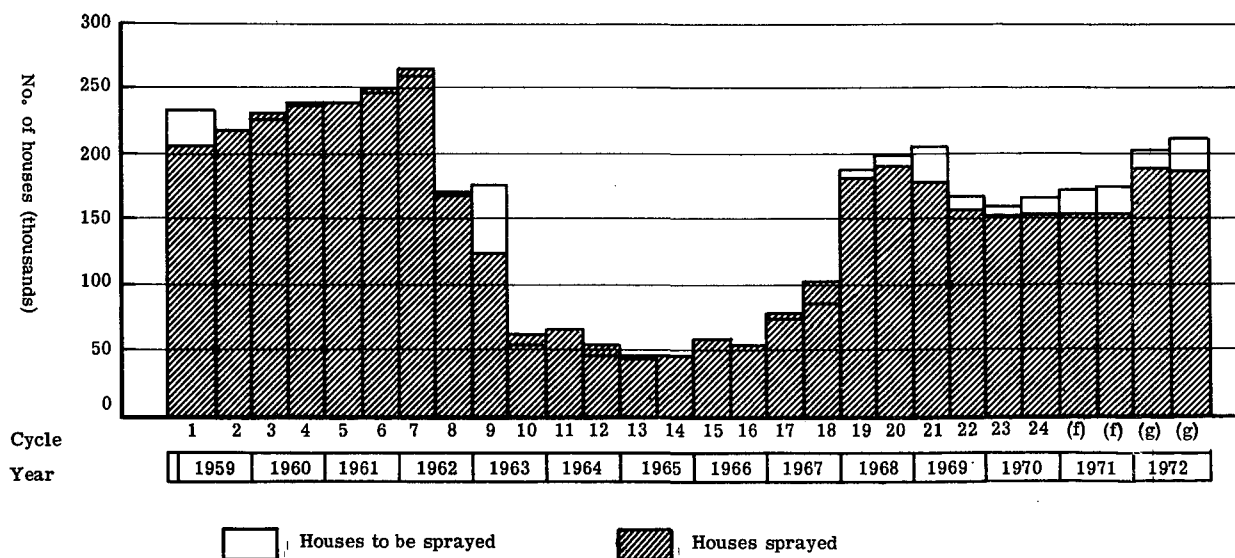
Activity	Professional	Non professional	Total
Spraying operations	1	248	249
Evaluation operations	3	147	150
Administrative and other	1	56	57
Transport	-	59	59
Total	5	510	515

## TRANSPORT FACILITIES

Type	Spraying Operations	Evaluation Operations	Mixed or other operations	Total
Four-wheel vehicles	-	-	42	42
Two-wheel vehicles	-	10	-	10
Boats	-	-	17	17
Animals	-	-	-	-
Other	-	1	-	1
Total	-	11	59	70

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	(a)	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	(a)	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	(a)	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	(a)	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	19 239	275 698	268 086	423	362	8.3
		16th	35 808	36 793	(a)	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	(a)	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	(a)	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	(a)	1 429	1 429	779 082	796 541	478	259	7.1
12th	Jan. 70-Dec. 70	23rd	161 390	152 595	(b)	25 619	19 204	757 382	764 946	416	452	8.2
		24th	166 326	153 410	(c)	71 215	64 854	765 520	692 950	401	185 <sup>c</sup>	8.4
13th	Jan. 71-Dec. 71	25th	17 083	15 084	(d)	21 849 <sup>d</sup>	19 603 <sup>d</sup>	767 579	781 623	394	215 <sup>d</sup>	7.6
		26th	17 217	15 508	(e)	282 345 <sup>e</sup>	260 383 <sup>e</sup>	776 615	777 480	373	187 <sup>e</sup>	8.3
14th	Jan. 72-Dec. 72	27th	13 843	10 854	(e)	388 485	356 480	930 917	931 134	322	196 <sup>e</sup>	9.5
		28th	11 803	8 722	(e)			932 500	894 151	329		9.0

- a) The date cycles of malathion are in agreement with the cycles of DDT, although the malathion cycles are of four months. b) Two cycles with malathion. c) Summary of 3 quarterly spraying cycles with Propoxur, beginning 6 April. d) Summary of 4 cycles with malathion. e) Summary of 4 cycles with Propoxur. f) Total houses sprayed with DDT, malathion and Propoxur. g) Total houses sprayed with DDT and Propoxur.



## EPIDEMIOLOGICAL EVALUATION OPERATIONS, ATTACK PHASE AREAS

Year	Slides examined			Species found		
	Total No.	Positive		<u>P. falci-</u> <u>parum</u>	<u>P. vivax</u>	<u>P. malariae</u>
		Number	Percentage			
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	-
1970	281 386	27 260	9.7	5 180	22 080	-
1971	223 098	25 303	11.3	3 041	22 262	-
1972	208 232	9 595	4.6	666	8 929	-

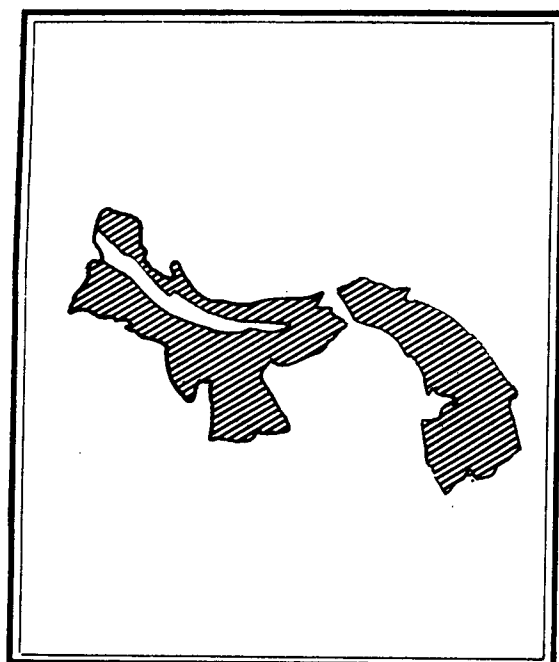
## CONSOLIDATION PHASE AREAS

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	<u>P. falci-</u> <u>parum</u>	<u>P. vivax</u>	<u>P. malariae</u>
							from abroad	from areas within country						
1962 <sup>a)</sup>	515	18 994 <sup>a)</sup>	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 <sup>b)</sup>	665	57 036	8.6	1 752	604	90	-	143	-	-	915	83	1 669	-

a) July-December. b) In 1967, consolidation areas reclassified to attack phase.

PANAMA

## STATUS OF MALARIA PROGRAM AT DECEMBER 1972



	Population (thousands)	Area km <sup>2</sup>
<b>TOTAL COUNTRY</b>	<b>1 523</b>	<b>75 650</b>
Non malarious areas	57	5 810
Originally malarious areas		
Maintenance phase	-	-
Consolidation phase	-	-
Attack phase	1 466	69 840
<b>Total originally malarious areas</b>	<b>1 466</b>	<b>69 840</b>

## PERSONNEL

Activity	Professional	Non professional	Total
Spraying operations	-	297	297
Evaluation operations	1	207	208
Administrative and other	2	63	65
Transport	-	18	18
<b>Total</b>	<b>3</b>	<b>585</b>	<b>588</b>

## TRANSPORT FACILITIES

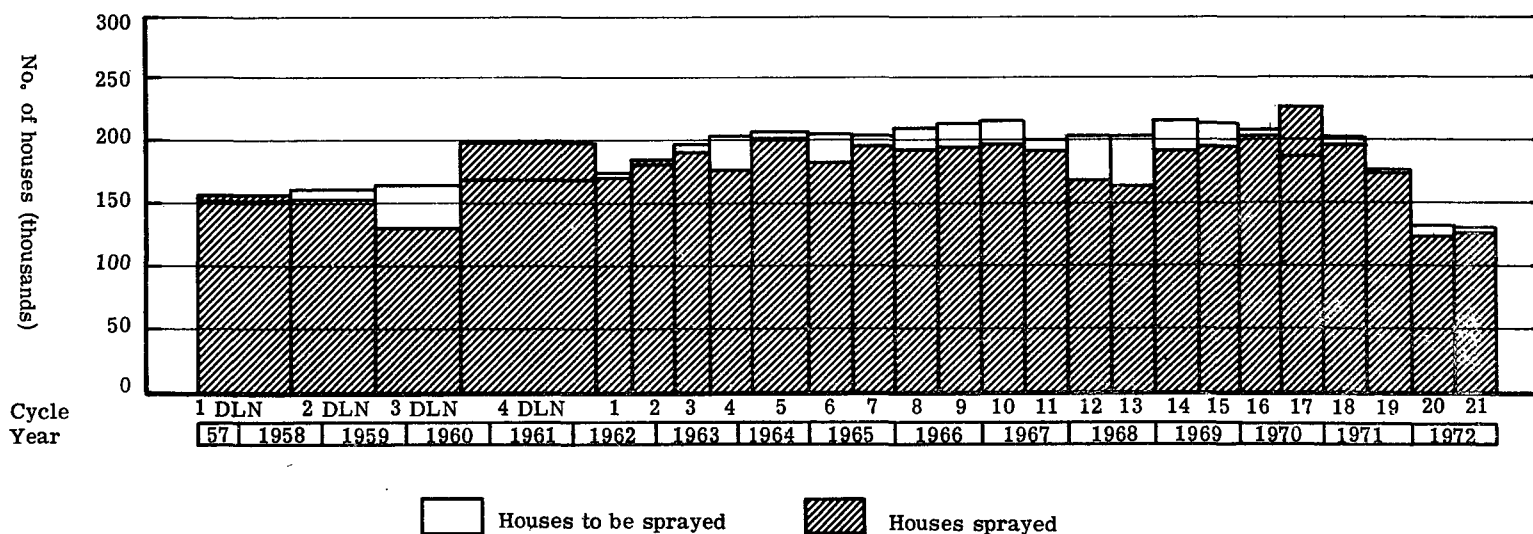
Type	Spraying Operations	Evaluation Operations	Mixed or other operations	Total
Four-wheel vehicles	68	7	13	88
Two-wheel vehicles	-	53	-	53
Boats	19	39	-	58
Animals	-	-	-	-
Other	44	47	-	91
<b>Total</b>	<b>131</b>	<b>146</b>	<b>13</b>	<b>290</b>



## 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 <sup>c)</sup>	710 918	711 983	490	63	8.1	
		2nd	182 784	184 355			1 192 <sup>c)</sup>	714 320	726 944	510	103	8.8	
6th	May 63-Apr. 64	3rd	197 379	193 960	-	(b)	1 024 <sup>c)</sup>	733 060	724 166	477	77	8.9	
		4th	205 165	176 912			1 268 <sup>c)</sup>	771 827	670 310	455	71	9.3	
7th	May 64-Jun. 65	5th	209 126	201 976	-	(b)	1 078 <sup>c)</sup>	750 420	728 633	440	77	9.0	
		6th	206 495	183 650			1 867 <sup>c)</sup>	724 990	647 164	421	77	9.0	
8th	Jul. 65-Jun. 66	7th	205 050	196 902	-	...	1 133 <sup>c)</sup>	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-Jun. 70	15th	215 369	196 003	-	-	-	755 945	757 402	495	-	7.1	
		16th	208 281	203 098			-	757 402	775 191	472	-	7.7	
13th	Jul. 70-Jun. 71	17th	189 385	187 414	1-2nd <sup>d)</sup>	-	39 316 <sup>d)</sup>	698 842	688 722	479	-	7.3	
		18th	201 656	197 882				853 503	825 776	471	-	7.5	
14th	Jul. 71-Jun. 72	19th	177 683	174 339	3-6th <sup>d)</sup>	54 300	55 278 <sup>d)</sup>	750 777	736 826	464	-	7.5	
		20th	132 985	125 341				484 451	438 096	461	-	7.2	
15th	Jul. 72-Dec.72	21st	131 447	126 008	7-10th <sup>d)</sup>		47 164	42 622	463 653	424 765	458	-	7.7

a) Estimated. b) Included in DDT column. c) Sprayed twice a year with 0.3 g/m<sup>2</sup>. d) Quarterly cycles with DDT.



PANAMA (Cont.)

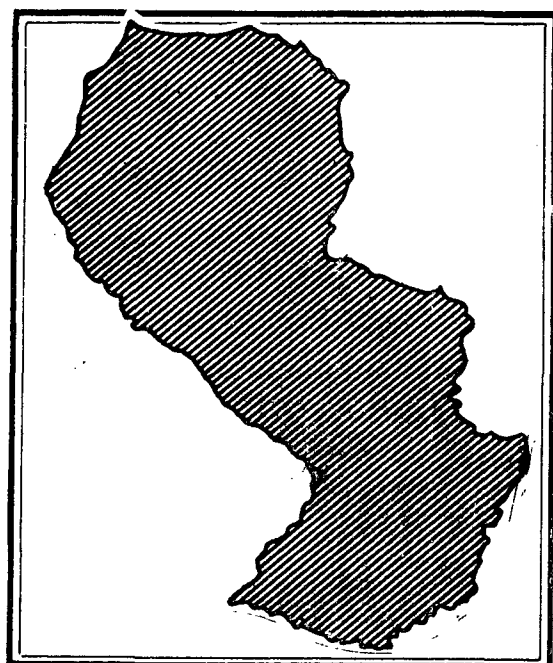
## EPIDEMIOLOGICAL EVALUATION OPERATIONS, ATTACK PHASE AREAS

Year	Slides examined			Species found		
	Total No.	Positive		<u>P. falci-</u> <u>parum</u> a)	<u>P. vivax</u>	<u>P. malariae</u>
		Number	Percentage			
1957b)	18 181	1 162	6.4	545	...	69
1958	91 933	6 067	6.6	1 461	4 537	2
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	-
1970	237 477	4 584	1.9	3 402	1 182	-
1971	301 930	1 041	0.3	572	468	1
1972	269 097	819	0.3	543	276	-

a) Includes mixed infections. b) August-December.

PARAGUAY

## STATUS OF MALARIA PROGRAM AT DECEMBER 1972



## TOTAL COUNTRY

Population  
(thousands)      Area km<sup>2</sup>

2 329      406 752

Non malarious areas

388      200

## Originally malarious areas

Maintenance phase

-      -

Consolidation phase

-      -

Attack phase

1 941      406 552

Total originally malarious areas      1 941      406 552

## PERSONNEL

Activity	Professional	Non professional	Total
Spraying operations	2	252	254
Evaluation operations	5	158	163
Administrative and other	-	90	90
Transport	-	70	70
Total	7	570	577

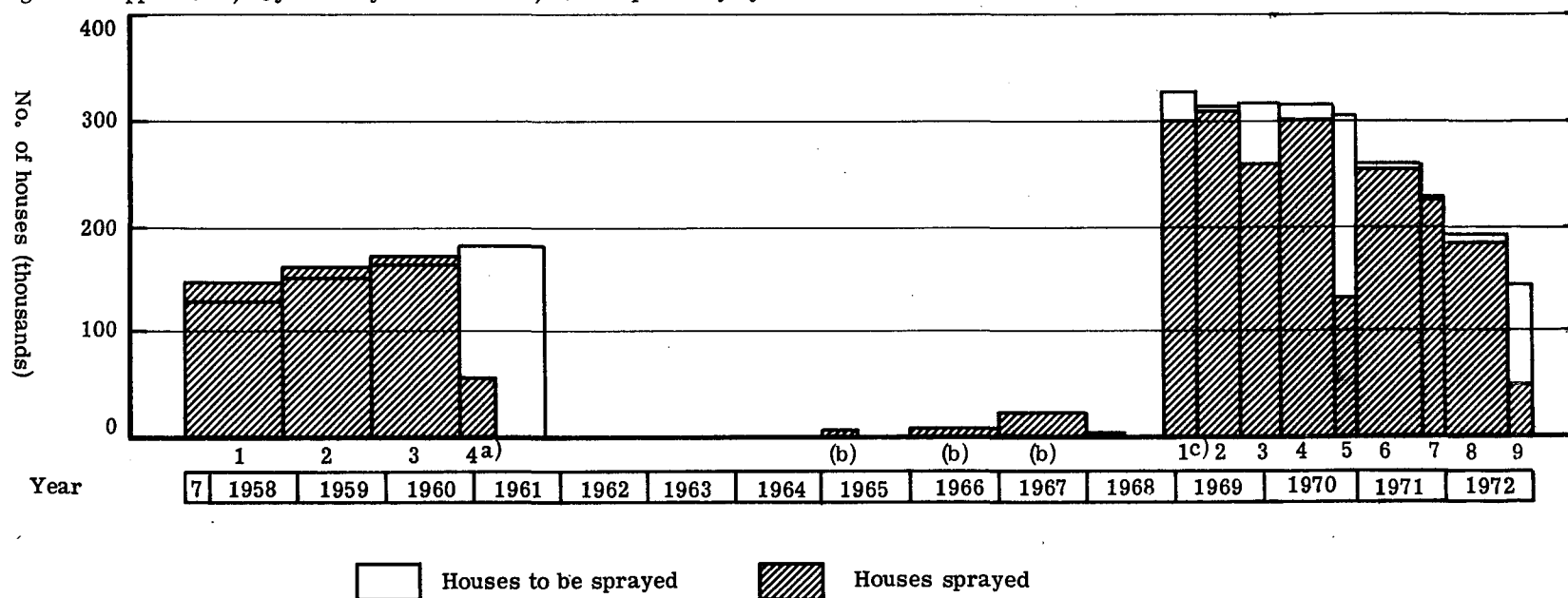
## TRANSPORT FACILITIES

Type	Spraying Operations	Evaluation Operations	Mixed or other operations	Total
Four-wheel vehicles	95	4	11	110
Two-wheel vehicles	-	100	-	100
Boats	7	14	-	21
Animals	-	-	-	-
Other	16	25	-	41
Total	118	143	11	272

## 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 <sup>a)</sup>	Nov. 60-Mar. 61	-	-	-	4th <sup>a)</sup>	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 <sup>c)</sup>	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		
2nd	Oct. 69-Sep. 70	3rd	317 805	313 917	-	-	-	1 397 988	1 378 239	477	-	9. 3
		4th	317 142	303 370				1 370 225	1 285 511	523		
3th	Oct. 70-Sep. 71	5th	308 357	300 154 <sup>d)</sup>	-	-	-	1 286 295	1 298 275	535	-	8. 7
		6th	256 189	255 789 <sup>d)</sup>				1 053 446	1 065 384	538		
4th	Oct. 71-Sep. 72	7th	227 811	228 570	-	-	-	962 015	943 668	536	-	8. 7
		8th	191 980	187 529				-	785 294	753 124		
5th	Oct. 72-Dec. 72	9th <sup>e)</sup>	145 124 <sup>e)</sup>	47 457 <sup>e)</sup>	1st-4th <sup>f)</sup>	4 800 <sup>f)</sup>	4 249 <sup>f)</sup>	599 759	203 598 <sup>e)</sup>	499	-	8. 6

a) Program suspended, new program being planned. b) Emergency spraying. c) New coverage started in October 1968. d) In addition 4 108 complementary sprayings were applied. e) Cycle not yet finished. f) Four quarterly cycles with DDT.



PARAGUAY (Cont.)

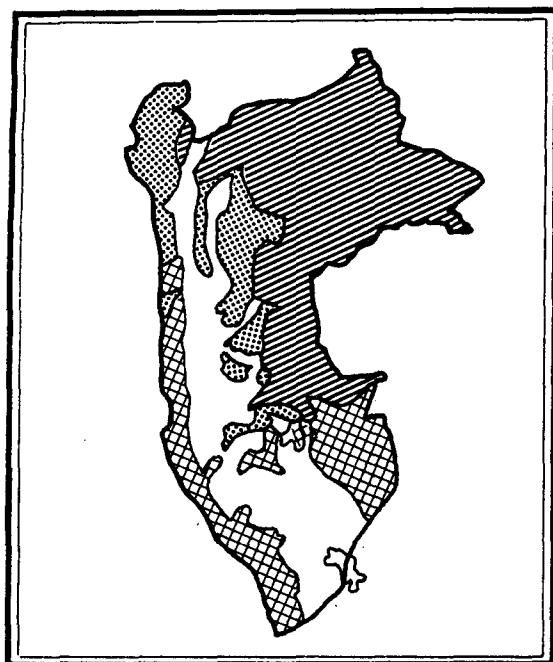
EPIDEMIOLOGICAL EVALUATION OPERATIONS, ATTACK PHASE AREAS

Year	Slides examined			Species found		
	Total No.	Positive		<u>P. falciparum</u> <sup>a)</sup>	<u>P. vivax</u>	<u>P. malariae</u>
		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	-
1970	157 587	1 429	0.9	155	1 274	-
1971	169 488	423	0.2	194	229	-
1972	185 659	94	0.1	11	83	-

a) Includes mixed infections.

PERU

## STATUS OF MALARIA PROGRAM AT DECEMBER 1972



	Population (thousands)	Area km <sup>2</sup>
<b>TOTAL COUNTRY</b>	<u>14 442</u>	<u>1 285 215</u>
Non malarious areas	<u>9 407</u>	<u>324 044</u>
Originally malarious areas		
Maintenance phase	<u>1 380</u>	<u>195 818</u>
Consolidation phase	<u>2 427</u>	<u>221 930</u>
Attack phase	<u>1 228</u>	<u>543 423</u>
<b>Total originally malarious areas</b>	<u>5 035</u>	<u>961 171</u>

## PERSONNEL

Activity	Professional	Non professional	Total
Spraying operations	3	334	337
Evaluation operations	8	366 (155)	374 (155)
Administrative and other	4	100	104
Transport	-	75	75
<b>Total</b>	<b>15</b>	<b>875 (155)</b>	<b>890 (155)</b>

## TRANSPORT FACILITIES

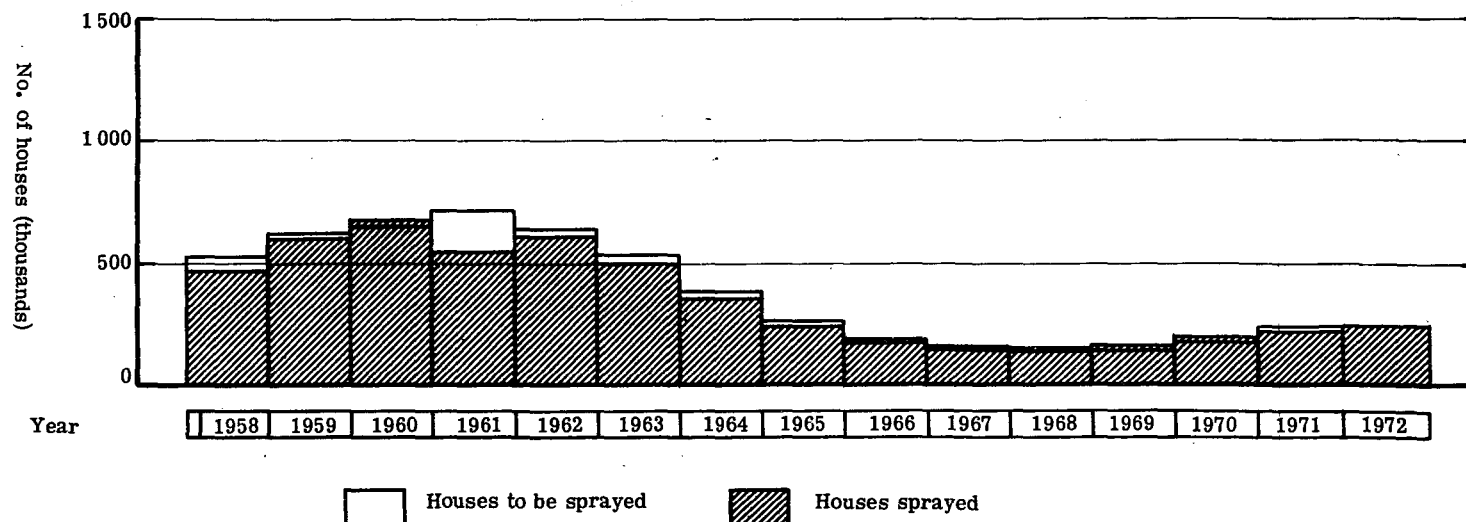
Type	Spraying Operations	Evaluation Operations	Mixed or other operations	Total
Four-wheel vehicles	9	112	14	135
Two-wheel vehicles	-	5	-	5
Boats	-	-	121	121
Animals	-	-	-	-
Other	-	-	4	4
<b>Total</b>	<b>9</b>	<b>117</b>	<b>139</b>	<b>265</b>

(Part-time personnel in parentheses)

## 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	-	8.1
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
13th	Jan. 70-Dec. 70	(d)	185 837	188 723f)	-	-	-	643 223	681 203	521	-	6.2
14th	Jan. 71-Dec. 71	(d)	229 327	218 566	-	-	-	780 994	757 451	510	-	6.8
15th	Jan. 72-Dec. 72	(d)	229 504	229 605	1st-3rdg)	36 063g)	36 936g)	816 587	808 967	508	-	7.1

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 calendar year. e) Sprayings. f) Includes houses sprayed in quarterly cycles. g) Three cycles sprayed with DDT.



## EPIDEMIOLOGICAL EVALUATION OPERATIONS, ATTACK PHASE AREAS

Year	Slides examined			Species found		
	Total No.	Positive		<u>P. falciparum</u>	<u>P. vivax</u>	<u>P. malariae</u>
		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	2 195	0.5	81	2 034	80
1963	309 519	1 678 b)	0.5	98	1 426	140
1964	308 283	1 613	0.5	301	1 222	90
1965	280 449	1 508	0.5	113	1 315	80
1966	247 298	1 934	0.7	32	1 802	100
1967	198 340	2 689	1.4	105	2 512	72
1968	129 951	1 970	1.5	51	1 875	44
1969	145 495	2 849	2.0	22	2 789	38
1970	164 262	4 008	2.4	134	3 800	74
1971	164 595	2 351	1.4	12	2 315	24
1972	144 680	3 734	2.6	3	3 704	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	<u>P. falciparum</u>	<u>P. vivax</u>	<u>P. malariae</u>
							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	-	-	-	-	1	-
1962	864	71 330	8.3	21	2	1	1	12	4	-	-	1	18	2
1963	2 199	172 468	7.8	65	13	6	5	38	3	-	1	-	58	7
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	157 663	8.0	108	14	4	1	5	1	-	83	-	108	-
1967	1 992	112 859	5.7	80	65	5	1	2	-	4	3	-	78	2
1968	2 184	85 336	3.9	34	10	6	1	9	1	-	7	1	31	2
1969	2 256	94 652	4.2	310	191	10	3	72	-	-	34	-	309	1
1970	2 283	112 359	4.9	253	160	11	-	55	1	3	23	-	252	1
1971	2 354	138 043	5.8	1 650	912	32	-	9	-	-	697	-	1 650	-
1972	2 427	140 696	5.8	5 507	1 939	50	-	14	-	-	3 504	-	5 506	1

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

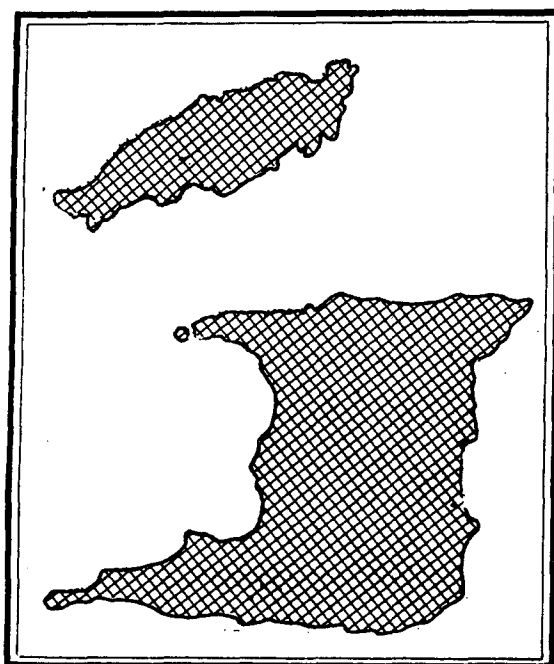


## MAINTENANCE PHASE AREAS

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	<u>P. falciparum</u>	<u>P. vivax</u>	<u>P. malariae</u>
							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
1970	1 299	33 681	2.6	234	160	-	-	2	-	-	72	1	230	3
1971	1 339	52 127	3.9	127	64	1	1	1	-	-	60	-	127	-
1972	1 380	55 708	4.0	29	3	1	1	16	2	3	3	2	26	1

TRINIDAD AND TOBAGO

## STATUS OF MALARIA PROGRAM AT DECEMBER 1972



	Population (thousands)	Area km <sup>2</sup>
TOTAL COUNTRY	1 033	5 605
Non malarious areas	217	161
Originally malarious areas		
Maintenance phase	816	5 444
Consolidation phase	-	-
Attack phase	-	-
Total originally malarious areas	816	5 444

## PERSONNEL

Activity	Professional	Non professional	Total
Spraying operations	-	83	83
Evaluation operations	1	92	93
Administrative and other	1	39	40
Transport	-	15	15
Total	2	229	231

## TRANSPORT FACILITIES

Type	Spraying Operations	Evaluation Operations	Mixed or other operations	Total
Four-wheel vehicles	3	10	-	13
Two-wheel vehicles	-	-	-	-
Boats	-	-	-	-
Animals	-	-	-	-
Other	-	-	-	-
Total	3	10	-	13

## EPIDEMIOLOGICAL EVALUATION OPERATIONS, ATTACK PHASE AREAS

Year	Slides examined			Species found		
	Total No.	Positive		<u>P. falciparum</u>	<u>P. vivax</u>	<u>P. malariae</u>
		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	-	-	-	-	-

## 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	<u>P. falciparum</u>	<u>P. vivax</u>	<u>P. malariae</u>
							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	-	-	-	-	-	-	-	-	-	-	-
1964	822	82 038	10.0	3	-	1	2	-	-	-	-	-	1	2

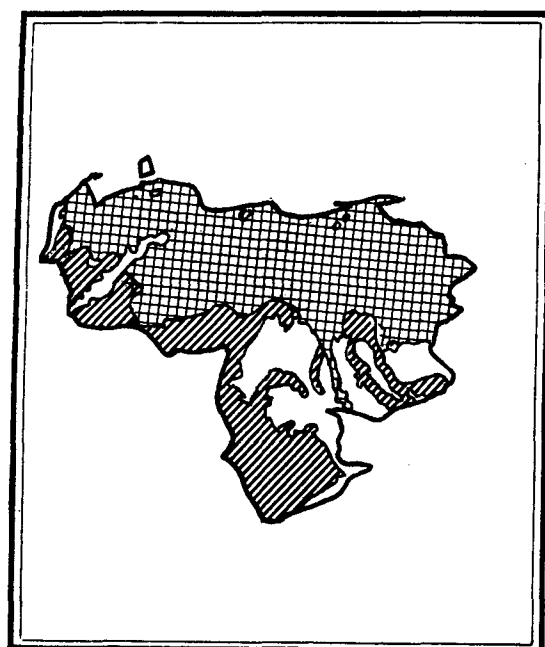
## MAINTENANCE PHASE AREAS

1965a)	846	58 922a)	7.6	2	-	-	2	-	-	-	-	2	-	-
1966	872	89 156	10.2	40	38	1	1	-	-	-	-	1	-	39
1967	872	74 255	8.5	-	-	-	-	-	-	-	-	-	-	-
1968	885	65 757	7.4	5	-	1	4	-	-	-	-	4	-	1
1969	970	42 272	4.4	5	-	-	5b)	-	-	-	-	3	-	2
1970	998	25 301	2.5	1	-	1	-	-	-	-	-	-	-	1
1971	1 018	23 929	2.4	3	-	2	1	-	-	-	-	1	-	2
1972	816	15 345	1.9	2	-	-	1	-	-	-	1c)	-	1	1

a) January-November. b) One relapse imported case. c) Cryptic case.

VENEZUELA

## STATUS OF MALARIA PROGRAM AT DECEMBER 1972



	Population (thousands)	Area km <sup>2</sup>
<b>TOTAL COUNTRY</b>	<u>10 278</u>	<u>912 050</u>
Non malarious areas	<u>2 637</u>	<u>312 050</u>
Originally malarious areas		
Maintenance phase	<u>7 157</u>	<u>460 054</u>
Consolidation phase	<u>-</u>	<u>-</u>
Attack phase	<u>484</u>	<u>139 946</u>
<b>Total originally malarious areas</b>	<u>7 641</u>	<u>600 000</u>

## PERSONNEL

Activity	Professional	Non professional	Total
Spraying operations	4	449	453
Evaluation operations	12	496	508
Administrative and other	(a)	(a)	(a)
Transport	(a)	(a)	(a)
<b>Total</b>	<b>16</b>	<b>945</b>	<b>961</b>

## TRANSPORT FACILITIES

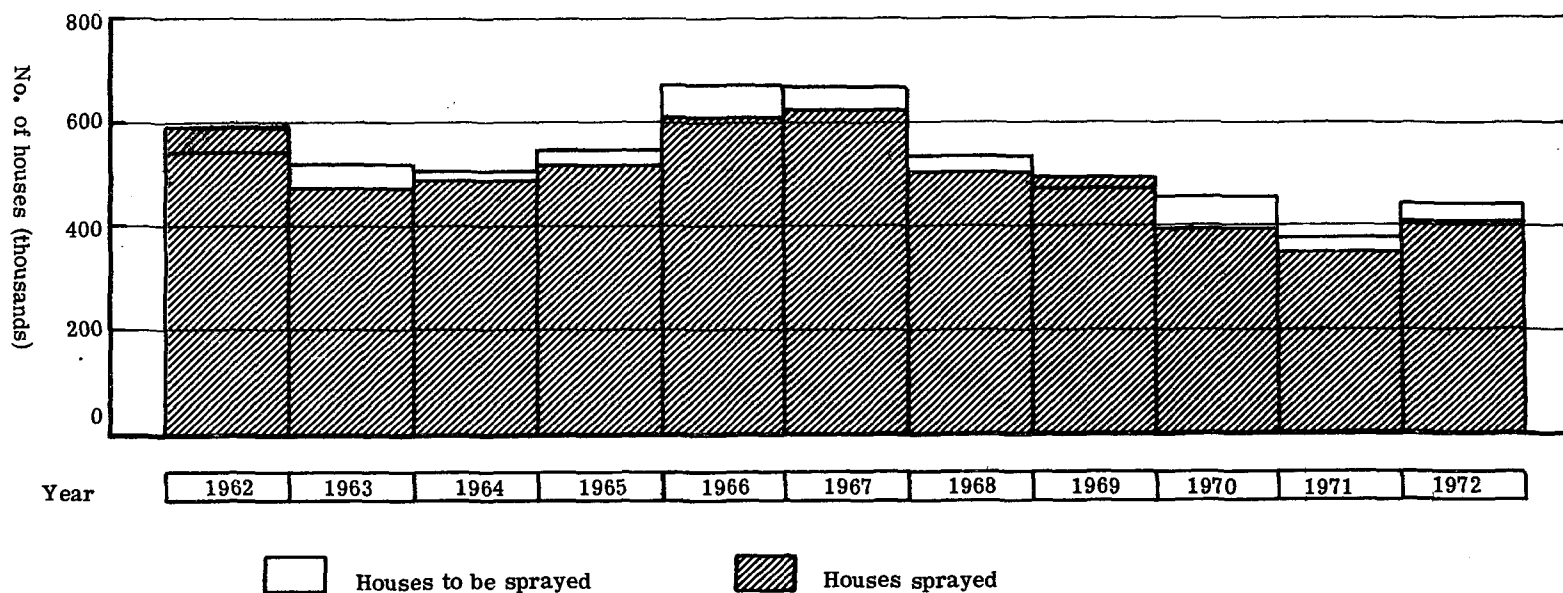
Type	Spraying Operations	Evaluation Operations	Mixed or other operations	Total
Four-wheel vehicles	149	144	-	293
Two-wheel vehicles	36	315	-	351
Boats	40	88	-	128
Animals	350	335	-	685
Other	84	-	-	84
<b>Total</b>	<b>659</b>	<b>882</b>	<b>-</b>	<b>1 541</b>

a) Services performed by personnel of the "Dirección de Malariología y Saneamiento Ambiental" in charge of different programs of Environmental Sanitation.

## 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 <sup>a)</sup>	...	(b)	29 782	2 305 330	2 024 180	365	218	6.6
...	Jan. 63-Dec. 63	...	526 626	475 753 <sup>a)</sup>	...	(b)	4 112	2 155 390	1 964 197	368	274	7.0
...	Jan. 64-Dec. 64	...	505 250	490 884 <sup>a)c)</sup>	...	(b)	(b)	2 069 353 <sup>d)</sup>	2 010 565	384	...	7.3
...	Jan. 65-Dec. 65	...	553 218 <sup>d)</sup>	522 616 <sup>a)c)</sup>	-	-	-	2 279 763 <sup>d)</sup>	2 153 429	422	-	7.0
...	Jan. 66-Dec. 66	...	676 336	611 665 <sup>a)c)</sup>	-	-	-	2 825 556	2 554 844	399	-	6.7
...	Jan. 67-Dec. 67	...	675 556	623 926 <sup>a)</sup>	-	-	-	2 837 335	2 578 451	373	-	7.2
...	Jan. 68-Dec. 68	...	543 874	505 452 <sup>a)</sup>	-	-	-	...	2 039 352	465	-	6.3
...	Jan. 69-Dec. 69	...	477 090	492 476 <sup>a)</sup>	-	-	-	1 744 475	1 996 617	479	-	6.8
...	Jan. 70-Dec. 70	...	451 291	397 766 <sup>a)</sup>	-	-	-	1 789 893	1 610 726	884	-	5.8
...	Jan. 71-Dec. 71	...	374 836	343 936 <sup>a)</sup>	-	-	-	1 506 408	1 375 523	916	-	6.2
...	Jan. 72-Dec. 72	...	443 341	403 867 <sup>a)</sup>	-	-	-	1 683 585	1 639 210	773	-	5.8

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		<u>P. falciparum</u>	<u>P. vivax</u>	<u>P. malariae</u>
		Number	Percentage			
1958	269 448	975 <sup>a</sup>	0.4	60	901	4
1959	232 710	765 <sup>a</sup>	0.3	92	646	14
1960	247 429	1 346 <sup>a</sup>	0.5	165	1 163	6
1961	230 336	1 175 <sup>a</sup>	0.5	68	1 075	21
1962	172 280	883 <sup>b</sup>	0.5	53	812	14
1963	153 406	2 194 <sup>b</sup>	1.4	80	2 083	20
1964	141 977	3 948 <sup>b</sup>	2.8	451	3 486	4
1965	171 864	2 739 <sup>a</sup>	1.6	137	2 597	2
1966	194 637	3 510 <sup>a</sup>	1.8	449	3 011	39
1967	249 057	4 281 <sup>a</sup>	1.7	933	3 323	18
1968 c)	198 732	5 401 <sup>a</sup>	2.7	1 486	3 838	54
1969	154 827	7 713 <sup>a</sup>	5.0	1 836	5 715	68
1970	88 391	11 915 <sup>a</sup>	13.5	1 524	10 320	17
1971	108 743	17 842 <sup>a</sup>	16.4	2 938	14 846	3
1972	112 618	13 483 <sup>d</sup>	12.0	4 714	8 765	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	<u>P. falciparum</u>	<u>P. vivax</u>	<u>P. malariae</u>
							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 <sup>a)</sup>	-	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 <sup>a)</sup>	-	1	29	7	-	37	-	22	51	-
1963	102	61 724	60.5	89 <sup>a)</sup>	-	-	32	7	-	50	-	26	62	-
1964	99	58 605	59.2	74	-	-	15	9	-	50	-	-	74	-
1965	132	57 709	43.7	34 <sup>a)</sup>	-	1	15	6	-	12	-	15	18	-
1966	67	40 752	60.8	46	-	-	19	10	-	17	-	8	38	-
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) In 1968 areas in consolidation were reclassified to attack phase.

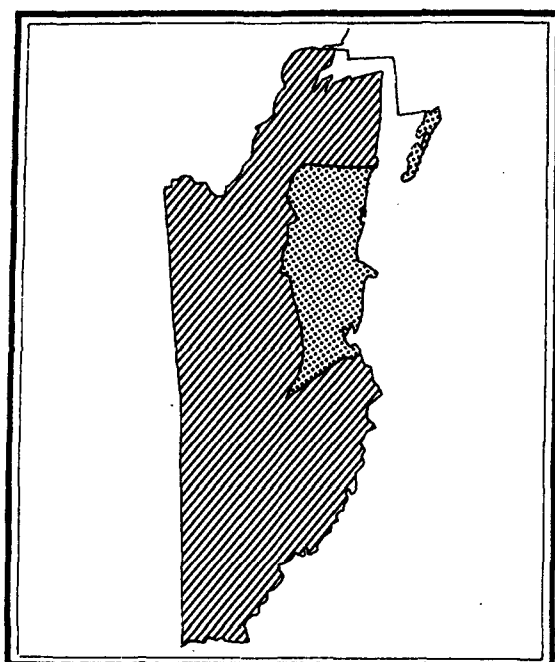
MAINTENANCE AND NON-MALARIOUS AREAS a)

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	<u>P. falciparum</u>	<u>P. vivax</u>	<u>P. malariae</u>
							from abroad	from areas within country						
1958	4 720	145 654	3.1	113 <sup>b)</sup>	-	-	79		5	28	1	6	100	6
1959	5 097	169 189	3.3	101 <sup>b)</sup>	-	-	87		6	7	1	14	73	9
1960	6 092	224 193	3.7	216 <sup>b)</sup>	-	6	44	92	4	70	-	14	197	4
1961	7 111	305 252	4.3	522 <sup>b)</sup>	-	11	52	122	4	333	-	13	498	5
1962	7 410	282 314	3.8	253 <sup>b)</sup>	-	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 <sup>b)</sup>	-	1	195	1 326	1	339	-	12	1 846	3
1965	8 205	315 462	3.8	2 591 <sup>b)</sup>	-	-	100	1 079	5	1 407	-	61	2 485	25
1966	8 506	432 151	5.1	1 925 <sup>b)</sup>	-	1	145	1 024	6	748	1	47	1 867	8
1967	8 772	373 853	4.3	942	-	1	79	611	3	248	-	75	861	4
1968	8 919	328 721	3.7	334	1	-	44	253	3	32	1	22	306	6
1969	9 151	313 331	3.4	1 027 <sup>b)</sup>	94	12	165	654	3	98	1	86	937	3
1970	9 382	183 058	2.0	3 373 <sup>b)</sup>	545	13	289	2 234	3	289	-	211	3 145	3
1971	7 017	159 184	2.3	5 664	220	3	76	4 407	3	955	-	584	5 014	1
1972	7 157	149 834	2.1	4 511	362	14	79	3 512	1	543	-	1 694	2 813	4

a) Started 1971 the information refers only to maintenance phase. b) Includes undifferentiated mixed infections.

BELIZE

## STATUS OF MALARIA PROGRAM AT DECEMBER 1972



## TOTAL COUNTRY

Population  
(thousands)Area km<sup>2</sup>

128

22 965

Non malarious areas

-

-

## Originally malarious areas

Maintenance phase

-

-

Consolidation phase

53

4 307

Attack phase

75

18 658

Total originally malarious areas

128

22 965

## PERSONNEL

Activity	Professional	Non professional	Total
Spraying operations	-	20	20
Evaluation operations	(1)	13 (2)	13 (3)
Administrative and other	-	3	3
Transport	-	2	2
Total	(1)	38 (2)	38 (3)

## TRANSPORT FACILITIES

Type	Spraying Operations	Evaluation Operations	Mixed or other operations	Total
Four-wheel vehicles	3	7	1	11
Two-wheel vehicles	-	-	2	2
Boats	-	4	4	8
Animals	-	-	-	-
Other	-	-	-	-
Total	3	11	7	21

(Part-time personnel in parentheses)



BELIZE (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
...	Jan. 67-Dec. 67	1st -2nd	...	15 820	...	48 213	399	7.6
...	Jan. 68-Dec. 68	3rd	10 720	10 297	70 450	45 167	463	7.5
		4th	10 720	5 375	70 450	24 802	489	6.8
...	Jan. 69-Jan. 70	5th	10 127	9 060	72 316	41 541	508	7.1
		6th	11 127	10 882	72 316	48 476	499	7.7
...	Feb. 70-Dec. 70	7th	11 127	11 443	72 316	50 000	421	8.5
		8th	11 735	7 772	70 030	34 433	475	8.2
...	Jan. 71-Dec. 71	9th	11 735	11 132	72 519	46 284	622	9.1
		10th	11 735	9 000	72 519	39 420	619	9.7
...	Jan. 72-Dec. 72	11th	12 274	12 060	72 520	52 486	617	9.1
		12th	12 070	10 238	74 914	43 810	602	9.2

a) New coverage started.

## EPIDEMIOLOGICAL EVALUATION OPERATIONS, ATTACK PHASE AREAS

Year	Slides examined			Species found		
	Total No.	Positive		<u>P. falci-</u> <u>parum</u>	<u>P. vivax</u>	<u>P. malariae</u>
		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	-
1967a)	12 959	358	2.8	160	198	-
1968	10 690	39	0.4	1	38	-
1969	10 725	27	0.3	-	27	-
1970	12 697	28	0.2	-	28	-
1971	12 531	31	0.2	1 <sup>b)</sup>	30	-
1972	16 561	84	0.5	-	84	-

## CONSOLIDATION PHASE AREAS

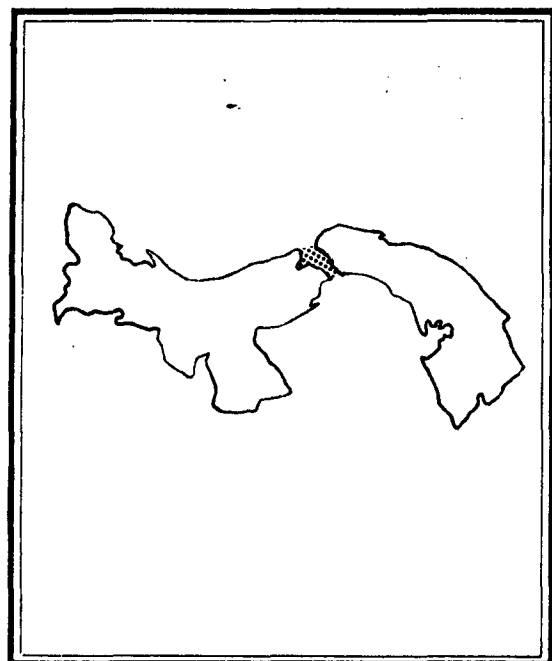
Year	Estimated population in the area (thousands)	No. of slides examined	% of population sampled (annual rate)	Total No. of positive cases	Origin of infections							Species of parasite		
					Autochthonous	Relapsing	Imported		Induced	Introduced	Not investigated and unclassified	<u>P. falci-</u> <u>parum</u>	<u>P. vivax</u>	<u>P. malariae</u>
							from abroad	from areas within country						
1962 <sup>c)</sup>	100	6 661 <sup>c)</sup>	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 <sup>d)</sup>	10	7	-
1968	48	1 581	3.3	-	-	-	-	-	-	-	-	-	-	-
1969	49	1 469	3.0	1	-	-	-	1	-	-	-	-	1	-
1970	50	2 825	5.7	5	3	1	-	-	-	-	1 <sup>d)</sup>	-	5	-
1971	51	3 172	6.2	2	1	-	-	-	-	-	1	2	-	-
1972	53	3 244	6.1	2	-	-	-	1	-	-	1	2	-	-

a) At the beginning of 1967 all areas were brought back to attack phase, with the exception of Belize District. b) Mixed infection.

c) August-December. d) Cryptic case.

CANAL ZONE

## STATUS OF MALARIA PROGRAM AT DECEMBER 1972



	Population (thousands)	Area km <sup>2</sup>
TOTAL COUNTRY	50	1 432
Non malarious areas	-	-
Originally malarious areas		
Maintenance phase	-	-
Consolidation phase	50	1 432
Attack phase	-	-
Total originally malarious areas	50	1 432

## PERSONNEL

Activity	Professional	Non professional	Total
Spraying operations	(1)	(22)	(23)
Evaluation operations	(1)	(16)	(17)
Administrative and other	-	-	-
Transport	-	(4)	(4)
Total	(2)	(42)	(44)

## 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)

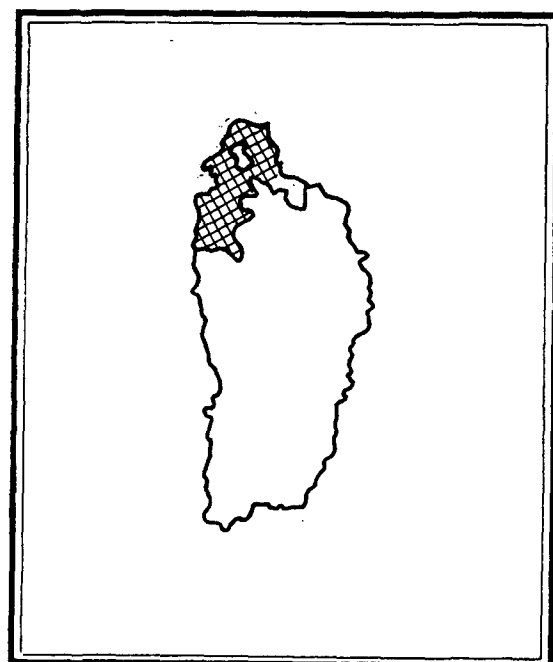
## CANAL ZONE (Cont.)

## 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	<u>P. falciparum</u>	<u>P. vivax</u>	<u>P. malariae</u>
							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	-
1966a)	50	23 434a)	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	-	-	-	1	5	84	-
1969	50	31 876	63.8	158	45	12	101	-	-	-	-	43	115	-
1970	51	35 462	69.5	57	16	2	39	-	-	-	-	35	22	-
1971	60	35 734	59.6	39	12	3	24	-	-	-	-	18	21	-
1972	50	38 896	77.8	41	6	7	28	-	-	-	-	32	9	-

a) January-November.

## STATUS OF MALARIA PROGRAM AT DECEMBER 1972

DOMINICA

	Population (thousands)	Area km <sup>2</sup>
TOTAL COUNTRY	<u>70</u>	<u>751</u>
Non malarious areas	<u>56</u>	<u>599</u>
Originally malarious areas		
Maintenance phase	<u>14</u>	<u>152</u>
Consolidation phase	<u>-</u>	<u>-</u>
Attack phase	<u>-</u>	<u>-</u>
Total originally malarious areas	<u>14</u>	<u>152</u>

## 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, ATTACK PHASE AREAS

Year	Slides examined			Species found		
	Total No.	Positive		<u>P. falci-</u> <u>parum</u>	<u>P. vivax</u>	<u>P. malariae</u>
		Number	Percentage			
1959 <sup>a)</sup>	2 801	46	1.6	46	-	-
1960	6 151	6	0.1	6	-	-
1961	10 113	3	0.0	1	-	2
1962	13 373	-	-	-	-	-

## 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	<u>P. falci-</u> <u>parum</u>	<u>P. vivax</u>	<u>P. malariae</u>
							from abroad	from areas within country						
1963	14	16 775	119.8	-	-	-	-	-	-	-	-	-	-	-
1964	14	16 154	115.4	-	-	-	-	-	-	-	-	-	-	-
1965	15	9 894	66.0	-	-	-	-	-	-	-	-	-	-	-

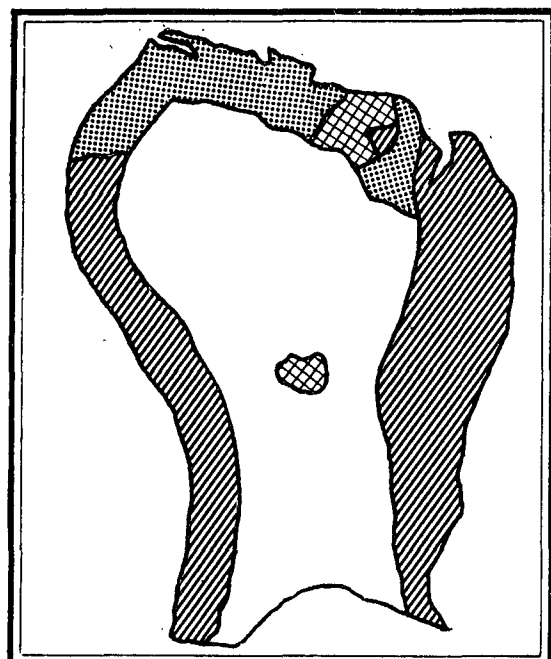
## MAINTENANCE PHASE AREAS

1966	17	6 634	39.0	-	-	-	-	-	-	-	-	-	-	-
1967	18	3 571 <sup>b)</sup>	19.9	-	-	-	-	-	-	-	-	-	-	-
1968	18	5 197	28.9	-	-	-	-	-	-	-	-	-	-	-
1969	18	2 779	15.4	-	-	-	-	-	-	-	-	-	-	-
1970	...	...	...	...	...	...	...	...	...	...	...	...	...	...
1971	18	678	3.8	-	-	-	-	-	-	-	-	-	-	-
1972	14	30	0.2	-	-	-	-	-	-	-	-	-	-	-

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

FRENCH GUIANA

## STATUS OF MALARIA PROGRAM AT DECEMBER 1972



## TOTAL COUNTRY

Population  
(thousands)

Area km<sup>2</sup>

50 90 000

Non malarious areas

- -

## Originally malarious areas

Maintenance phase

25 200

Consolidation phase

19 82 300

Attack phase

6 7 500

Total originally malarious areas 50 90 000

## PERSONNEL

Activity	Professional	Non professional	Total
Spraying operations	-	66	66
Evaluation operations	1	14	15
Administrative and other	1	4	5
Transport	-	26	26
Total	2	110	112

## TRANSPORT FACILITIES

Type	Spraying Operations	Evaluation Operations	Mixed or other operations	Total
Four-wheel vehicles	-	-	10	10
Two-wheel vehicles	-	-	-	-
Boats	-	-	3	3
Animals	-	-	-	-
Other	-	-	9	9
Total	-	-	22	22

## 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 <sup>a)</sup>	37 915	14 762	330	...	...
...	Jan. 65-Dec. 65	...	2 127	1 246	...	8 912	7 318 <sup>a)</sup>	...	...	253	...	...
...	Jan. 66-Dec. 66	...	2 117	2 500	...	8 912	6 932 <sup>a)</sup>	44 433	38 000	...	...	...
...	Feb. 67-Dec. 67	...	3 886	845	...	10 574	8 081 <sup>a)</sup>	...	...	...	...	...
...	Feb. 68-Dec. 68	...	3 000	2 977	...	11 000	10 487 <sup>b)</sup>	46 400	...	...	...	...
...	Feb. 69-Dec. 69	...	(c)	(c)	...	28 105 <sup>c)</sup>	26 861 <sup>c)</sup>	43 500	43 500	...	...	...
...	Feb. 70-Dec. 70	...	-	-	...	28 050	27 967 <sup>c)</sup>	45 000	45 000	...	...	...
...	Jan. 71-Dec. 71	...	-	1 996	-	-	-	-	-	-	-	-
...	Jan. 72-Dec. 72	...	15 899	12 361	-	-	-	50 000	-	-	-	-

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.



## EPIDEMIOLOGICAL EVALUATION OPERATIONS, ATTACK PHASE AREAS

Year	Slides examined			Species found		
	Total No.	Positive		<u>P. falciparum</u>	<u>P. vivax</u>	<u>P. malariae</u>
		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 a)	680	12	1.8	7	5	-
1970	1 057	45	4.3	41	4	-
1971	804	62	7.7	62	-	-
1972	1 774	23	1.3	21	2	-

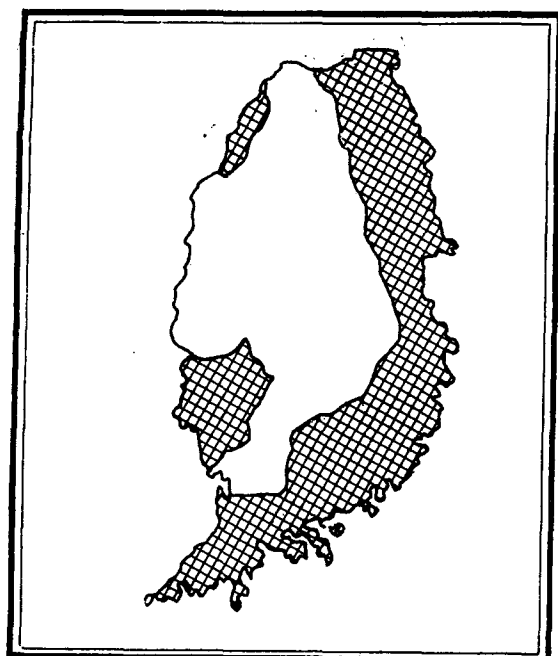
## CONSOLIDATION PHASE AREAS

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	<u>P. falciparum</u>	<u>P. vivax</u>	<u>P. malariae</u>
							from abroad	from areas within country						
1969 a)	15	185	1.2	20	17	-	-	3	-	-	-	9	11	-
1970	15	137	1.0	19	8	-	11	-	-	-	-	10	9	-
1971	14	467	3.3	34	15	-	-	-	1	-	18	22	12	-
1972	19	915	4.8	69	50	-	-	-	-	-	19	63	6	-

## MAINTENANCE PHASE AREAS

1969 a)	25	6 135	24.5	20	13	2	-	5	-	-	-	4	16	-
1970	27	7 043	26.1	53	6	1	5	-	-	36	5	50	3	-
1971	33	5 905	18.0	20	6	2	1	-	-	-	11	16	4	-
1972	25	4 908	19.6	100	11	-	2	41	-	-	46 <sup>b)</sup>	94	6	-

a) Before 1969, information not separated by phase of program. b) Includes 6 cryptic cases.

GRENADA AND CARRIACOU**STATUS OF MALARIA PROGRAM AT DECEMBER 1972****TOTAL COUNTRY**

Population  
(thousands)      Area km<sup>2</sup>

98      342

Non malarious areas

61      239

**Originally malarious areas**

Maintenance phase

37      103

Consolidation phase

-      -

Attack phase

-      -

Total originally malarious areas

37      103

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

**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	-	-	-	-

GRENADA AND CARRIACOU (Cont.)

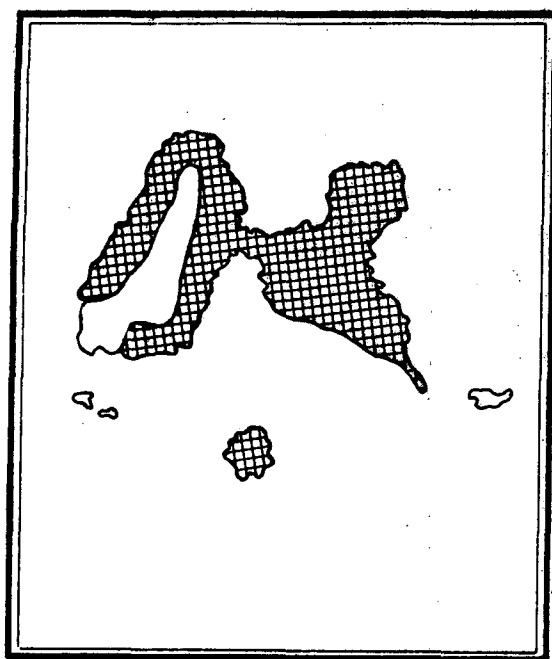
EPIDEMIOLOGICAL EVALUATION OPERATIONS, MAINTENANCE PHASE AREAS

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	<u>P. falciparum</u>	<u>P. vivax</u>	<u>P. malariae</u>
							from abroad	from areas within country						
1962	37	1996	5.4	-	-	-	-	-	-	-	-	-	-	-
1963	37	56	0.2	-	-	-	-	-	-	-	-	-	-	-
1964	39	517	1.3	-	-	-	-	-	-	-	-	-	-	-
1965	32	1085	3.4	-	-	-	-	-	-	-	-	-	-	-
1966	32	1263	3.9	-	-	-	-	-	-	-	-	-	-	-
1967	34	1200	3.5	-	-	-	-	-	-	-	-	-	-	-
1968	34	218	0.6	-	-	-	-	-	-	-	-	-	-	-
1969 <sup>a)</sup>	36	980 <sup>a)</sup>	5.4	-	-	-	-	-	-	-	-	-	-	-
1970	36	644	1.8	-	-	-	-	-	-	-	-	-	-	-
1971	...	...	...	...	...	...	...	...	...	...	...	...	...	...
1972	37	1026	2.8	1	-	-	1	-	-	-	-	-	-	1

a) January-June.

GUADELOUPE

## STATUS OF MALARIA PROGRAM AT DECEMBER 1972



	Population (thousands)	Area km <sup>2</sup>
<b>TOTAL COUNTRY</b>	<b>337</b>	<b>1 779</b>
Non malarious areas	42	643
Originally malarious areas		
Maintenance phase	295	1 136
Consolidation phase	-	-
Attack phase	-	-
<b>Total originally malarious areas</b>	<b>295</b>	<b>1 136</b>

## PERSONNEL

Activity	Professional	Non professional	Total
Spraying operations	-	-	-
Evaluation operations	-	-	-
Administrative and other	-	-	-
Transport	-	-	-
<b>Total</b>	<b>-</b>	<b>-</b>	<b>-</b>

## TRANSPORT FACILITIES

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

EPIDEMIOLOGICAL EVALUATION OPERATIONS, ATTACK PHASE AREAS

Year	Slides examined			Species found		
	Total No.	Positive		<u>P. falciparum</u>	<u>P. vivax</u>	<u>P. malariae</u>
		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	<u>P. falciparum</u>	<u>P. vivax</u>	<u>P. malariae</u>
							from abroad	from areas within country						
1958	129	4 887	3.8	-	-	-	-	-	-	-	-	-	-	-
1959	133	3 691	2.8	-	-	-	-	-	-	-	-	-	-	-
1960	145	7 080	4.9	-	-	-	-	-	-	-	-	-	-	-
1961	186	11 857	6.4	-	-	-	-	-	-	-	-	-	-	-
1962	66	11 196	17.0	-	-	-	-	-	-	-	-	-	-	-

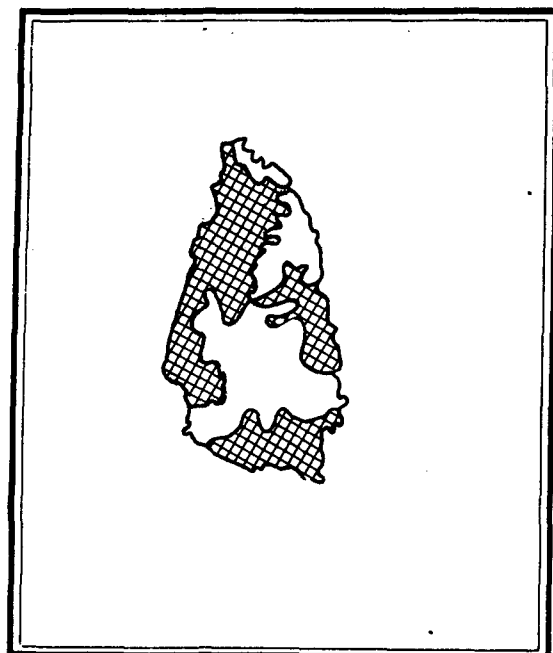
MAINTENANCE PHASE AREAS

1961	58	2 407	4.1	-	-	-	-	-	-	-	-	-	-	-
1962	187	5 239	2.8	-	-	-	-	-	-	-	-	-	-	-
1963a)	260	17 170a)	8.8	1	-	-	1	-	-	-	-	1	-	-
1964	298b)	21 831c)	7.3	-	-	-	-	-	-	-	-	-	-	-
1965	300b)	33 512c)	11.2	-	-	-	-	-	-	-	-	-	-	-
1966	312b)	32 022c)	10.3	-	-	-	-	-	-	-	-	-	-	-
1967	287	17 882c)	6.2	-	-	-	-	-	-	-	-	-	-	-
1968	289	14 018c)	4.9	-	-	-	-	-	-	-	-	-	-	-
1969	335b)	17 412c)	5.2	-	-	-	-	-	-	-	-	-	-	-
1970	335b)	56 215c)	16.8	-	-	-	-	-	-	-	-	-	-	-
1971	...	...	...	...	...	...	...	...	...	...	...	...	...	...
1972	295	...	...	...	...	...	...	...	...	...	...	...	...	...

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

ST. LUCIA

## STATUS OF MALARIA PROGRAM AT DECEMBER 1972



	Population (thousands)	Area km <sup>2</sup>
TOTAL COUNTRY	101	603
Non malarious areas	5	93
Originally malarious areas		
Maintenance phase	96	510
Consolidation phase	-	-
Attack phase	-	-
Total originally malarious areas	96	510

## 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	-	-	-	-

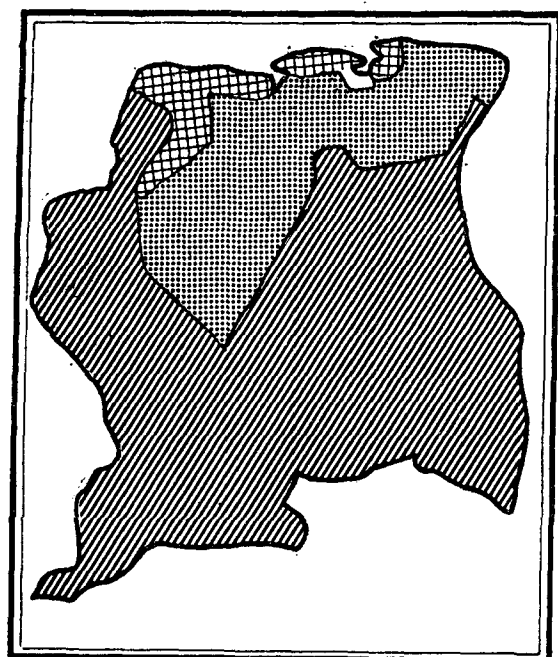
## EPIDEMIOLOGICAL EVALUATION OPERATIONS, MAINTENANCE PHASE AREAS

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	<u>P. falciparum</u>	<u>P. vivax</u>	<u>P. malariae</u>
							from abroad	from areas within country						
1962 <sup>a)</sup>	82	5 059 <sup>a)</sup>	24.7	-	-	-	-	-	-	-	-	-	-	-
1963	82	15 136	18.5	7	2	2	-	-	-	-	3 <sup>b)</sup>	-	-	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	-	-	-	-	-	-	-	-	-	-	-
1970	...	...	...	...	...	...	...	...	...	...	...	...	...	...
1971	...	...	...	...	...	...	...	...	...	...	...	...	...	...
1972	96	27	0.0	1	-	-	-	-	1	-	-	-	-	1

a) October-December. b) Unknown origin.

SURINAM

## STATUS OF MALARIA PROGRAM AT DECEMBER 1972



	Population (thousands)	Area km <sup>2</sup>
TOTAL COUNTRY	<u>400</u>	<u>163 820</u>
Non malarious areas	<u>142</u>	<u>70</u>
Originally malarious areas		
Maintenance phase	<u>180</u>	<u>17 020</u>
Consolidation phase	<u>42</u>	<u>47 280</u>
Attack phase	<u>36</u>	<u>99 450</u>
Total originally malarious areas	<u>258</u>	<u>163 750</u>

## PERSONNEL

Activity	Professional	Non professional	Total
Spraying operations	-	38	38
Evaluation operations	1	36	37
Administrative and other	1	10	11
Transport	-	38	38
Total	2	122	124

## TRANSPORT FACILITIES

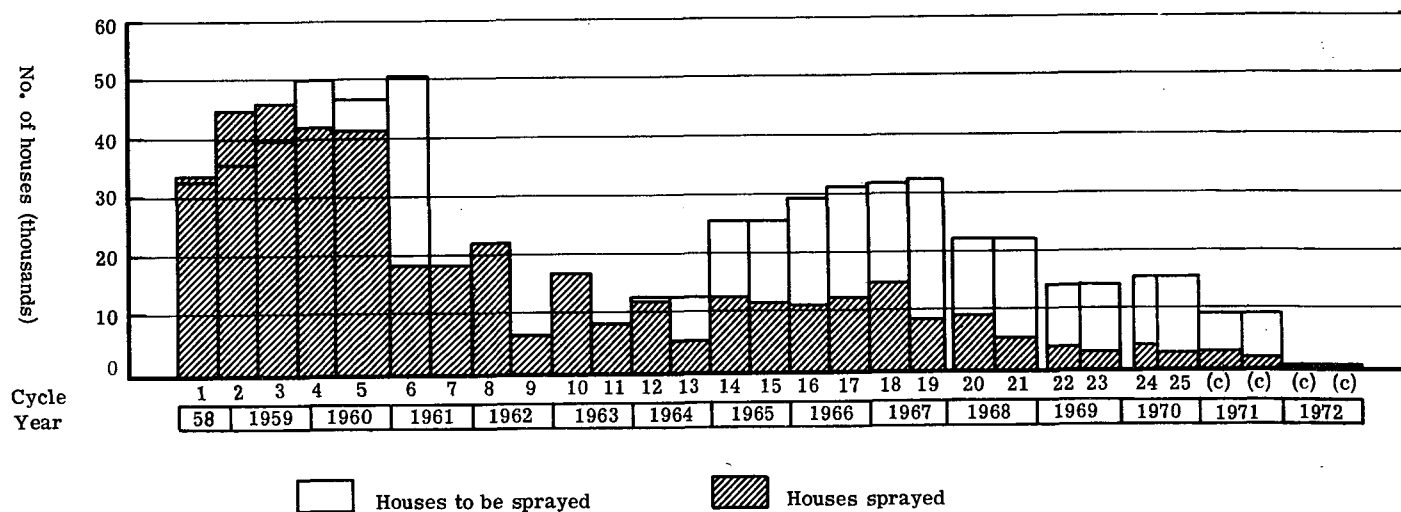
Type	Spraying Operations	Evaluation Operations	Mixed or other operations	Total
Four-wheel vehicles	-	2	6	8
Two-wheel vehicles	-	12	-	12
Boats	-	18	-	18
Animals	-	-	-	-
Other	-	-	-	-
Total	-	32	6	38



## 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 <sup>b)</sup>	33 537 <sup>b)</sup>	-	-	...
5th	Jul. 62-Jun. 63	9th	...	6 397	-	-	-	...	16 523 <sup>b)</sup>	-	-	...
		10th	...	16 681			-	...	42 558			
6th	Jul. 63-Jun. 64	11th	...	8 458	-	-	-	...	19 164	-	-	...
		12th	12 824	5 603			1st	(a)	6 605			
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
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
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
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
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
12th	Jul. 69-Jun. 70	23rd	14 550	399	12th	(a)	2 898	36 250	2 202	220	61	6.1
		24th	15 400	250			13th	(a)	3 599	36 636	5 754	307
13th	Jul. 70-Dec. 70	25th	15 400	193	14th	(a)	2 477	36 636	4 831	328	84	4.4
14th	Jan. 71-Dec. 71	-	-	-	...	9 100	2 623	13 850	706	-	66	5.2
		-	-	-	...	9 100	1 880	13 850	793	-	65	6.5
15th	Jan. 72-Dec. 72	-	-	-	...	620	233 <sup>c)</sup>	2 550	732	-	-	-
		-	-	-	...	620	254 <sup>c)</sup>	2 550	896	-	-	-

a) Included in DDT column. b) Estimated. c) Spraying is being carried out as emergency measure only.



## EPIDEMIOLOGICAL EVALUATION OPERATIONS, ATTACK PHASE AREAS

Year	Slides examined			Species found		
	Total No.	Positive		<u>P. falciparum</u>	<u>P. vivax</u>	<u>P. malariae</u>
		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	6.9	1 517	1	12
1969	23 289	671	2.9	666	4	1
1970	22 892	935	4.1	925	10	-
1971	23 893	1 463	6.1	1 462	-	1
1972	29 011	715	2.5	668	47	-

## 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	<u>P. falciparum</u>	<u>P. vivax</u>	<u>P. malariae</u>
							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	199d)	14 905d)	7.5	70d)	22	1	-	15	-	4	28	68	2	-
1970	27	25 810	95.6	84	5	-	-	22	-	-	57	84	-	-
1971	39	12 689	32.5	69	-	-	3	11	-	38	17	69	-	-
1972	42	20 340	48.4	84	2	-	-	2	-	71	9	84	-	-
MAINTENANCE PHASE AREAS														
1971	178	15 724	9.0	14	-	-	-	12	-	-	2	14	-	-
1972	180	10 249	5.7	1	-	-	-	1	-	-	-	1	-	-

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

The Final Report of the Third Special Meeting of Ministers of Health of the Americas, (Santiago, Chile, October 2-9, 1972) recognized as feasible the goal of achieving eradication in areas inhabited by 90.7 per cent of the population of regions of the Americas originally subject to malaria. For the remaining 9.3 per cent, a definitive solution of the problem will depend up on the application of more effective methods against the vector, or the parasite, or to protect the susceptible population, using a flexible strategy adapted to each area's epidemiological conditions.

The areas in which satisfactory progress has not been achieved are inhabited by 20.0 million people. These areas have diverse characteristics, including: vast, sparsely populated areas in which operations are difficult (e. g., the Amazon region of Brazil), areas in which progress depends on the procurement of an adequate budget and areas in which the existence of technical problems makes progress dependent upon the application of new methods of attack.

The technical problems affecting progress are related to: 1) the vector's physiological resistance to the commonly used insecticides; 2) behavioral resistance, which exists when the vector avoids contact with surfaces sprayed with residual-action insecticides; 3) the parasite's resistance to antimalarial drugs, and 4) human ecology, particularly migration, settlement and housing.

The countries most affected by technical problems are El Salvador, Guatemala, Honduras and Nicaragua. The four countries contain regions considered "problem areas," inhabited by only 25 per cent of all people who live in malarious areas in those countries but accounting for the largest share (75 per cent in 1971) of the recorded cases. The problem lies primarily in the fact that the vector A. albimanus, is physiologically resistant to chlorinated and some phosphorated (Malathion) insecticides.

The vector has also been found to be physiologically resistant to DDT and Dieldrin in Mexico and Haiti. A similar problem was identified in Costa Rica and Panama, but since it has been resolved through the application of other measures they are not included in the list of countries with special technical problems.

In parts of western Venezuela and in border areas of Colombia, the vector A. nufleztovari avoids contact with areas sprayed with insecticides, thus contributing to the persistence of transmission in those areas.

Strains of P. falciparum resistant to chloroquine have been found in parts of Brazil, Colombia, Guyana, Panama, Surinam and Venezuela, but there are drugs which can be used in place of chloroquine to cure the infection. Moreover, when insecticides are effective in interrupting transmission, the problem of parasites resistant to drugs is of less epidemiological importance (Map 3).

Various factors in addition to the aforementioned technical problems complicate efforts to interrupt the transmission of malaria. They include population dispersion, as in the Amazon River Valley; public works construction, such as the Trans-Amazon Highway in Brazil; the seasonal migration of workers in cotton-growing areas of Central America; colonization of new agricultural areas in Colombia, and the migratory movement of gold and diamond seekers in Venezuela. These problems have forced the countries to turn to more costly measures, with all their administrative and financial repercussions.

Table 24 summarizes the major technical problems affecting the program while Map 4 locates the affected areas.

# AREAS WHERE CASES OF FALCIPARUM RESISTANT TO 4-AMINOQUINOLINES HAVE BEEN NOTIFIED



Table 24

AREAS WHERE PROGRESS DEPENDS ON THE APPLICATION OF NEW ATTACK MEASURES  
TO SOLVE TECHNICAL PROBLEMS

Country and area	Population (area with problems)	Area Km <sup>2</sup>	Insecticide		Principal vector	Causes of problem	Attack measures		Measures planned for 1973
			Kind used	Years of coverage			Applied in 1972	Results obtained	
<u>Colombia</u>									
1 - Bajo Cauca	21 769	11 199	DDT	13	<u>A. darlingi</u> <u>A. punctimac.</u> <u>A. nufieztovari</u> <u>A. albimanus</u>	Vector; poor housing, colonization, social problems	PTC twice a month, Quarterly spray. with DDT + BHC	Good	Semestrial medication
Uraba	91 080	3 850	"	11	"	"	"	"	"
Catatumbo	6 458	1 579	"	9	<u>A. nufieztovari</u> <u>A. punctimac.</u>	Vector; poor housing, colonization	"	Very good	To continue PTC
Sarare	22 704	12 235	"	7	<u>A. nufieztovari</u> <u>A. neivae</u> <u>A. darlingi</u> <u>A. punctimac.</u>	"	"	Good	"
Central Pacific litoral	146 473	28 734	"	11	<u>A. neivae</u> <u>A. albimanus</u>	Vector; poor housing difficult operations	Semestrial spray. with DDT	Transmission persists	Entomological studies
Magdalena Medio	183 834	21 544	"	7	<u>A. nufieztovari</u> <u>A. darlingi</u> <u>A. punctimac.</u> <u>A. albimanus</u>	Social problems, vector; poor housing	"	"	To improve coverage
Alto Territorio Vásquez	7 216	529	"	9	<u>A. darlingi</u> <u>A. punctimac.</u>	Colonization	"	"	"
Ariari	47 905	26 786	"	7	<u>A. nufieztovari</u> <u>A. darlingi</u> <u>A. punctimac.</u>	Refusal, poor housing, colonization	Medication in selective localities	"	Sanitary education

Table 24 (Cont.)

AREAS WHERE PROGRESS DEPENDS ON THE APPLICATION OF NEW ATTACK MEASURES  
TO SOLVE TECHNICAL PROBLEMS

Country and area	Population (area with problems)	Area Km <sup>2</sup>	Insecticide		Principal vector	Causes of problem	Attack measures		Measures planned for 1973
			Kind used	Years of coverage			Applied in 1972	Results obtained	
<u>Colombia (Cont.)</u>									
Alto Caqueta	49 095	25 570	DDT	9	<u>A. darlingi</u> <u>A. punctimac.</u>	Colonization	Medication in selective localities	Good	Semestrial medication
Total	576 534	132 026							
<u>El Salvador</u>									
2 - Coastal area	835 761	7 689	DDT Pro- poxur	17 2	<u>A. albimanus</u>	Vector resistance	Sprayings with DDT and Propoxur	Decrease in transmission	To continue Propoxur sprayings
<u>Haiti</u>									
3 - Cite Simone O. Duvalier	18 903	-	DDT	5	<u>A. albimanus</u>	Vector resistance	Drainage and larvicides	Good	Same as in 1972
Jacmel	5 384	-	"	11	"	"	-	-	Usage of other insecticides
Cayes-Jacmel	2 008	-	"	"	"	Migrations and floods	Residual sprayings	-	"
Valle de la Coma	11 292	-	"	10	"	Migrations; aggressions of sprayed surfaces	"	-	"
Gross-Morne	13 700	-	"	"	"	Vector resistance	-	-	"
Petit-Goave	32 099	-	"	11	"	Migrations; aggressions of sprayed surfaces	ULV sprayings	-	"
Total	83 386								

Table 24 (Cont.)

AREAS WHERE PROGRESS DEPENDS ON THE APPLICATION OF NEW ATTACK MEASURES  
TO SOLVE TECHNICAL PROBLEMS

Country and area	Population (area with problems)	Area Km <sup>2</sup>	Insecticide		Principal vector	Causes of problem	Attack measures		Measures planned for 1973
			Kind used	Years of coverage			Applied in 1972	Results obtained	
<u>Honduras</u>									
4 - Southern area	153 238	2 936	DDT DLN MAL	6 1 1 1/2	<u>A. albimanus</u> <u>A. pseudopunct.</u>	Resistance to DDT and DLN; internal and external migrat. of population	Sprayings with Propoxur	Satisfactory	Quarterly sprayings with Propoxur
5 - Jamastran Valley	21 365	1 695	DDT DLN	11 1/2 1	"	"	"	"	"
6 - Talanga and Cedros Valleys	21 972	805	"	"	"	"	"	"	"
Total	196 575	5 436							
<u>Mexico</u>									
7 - Basins of Rivers Fuerte, Sinaloa, Humaya and Tama- zola	420 600	20 411	DDT DLN	15 <sup>a)</sup>	<u>A. pseudopunct.</u>	Internal migration; incipient resist.; poor housing; ag- gressions of sprayed surfaces	Semestrial spray. with DDT; Treatm. of cases and col- aterals by spraying personnel.	Transmission persists	Same as in 1972. No new measures to be applied.
8 - Huicot	109 119	27 323	"	"	"	Population movem.; poor housing; ag- gressions of spray. surfaces; tempo- rary shelters	"	"	"
9 - Basin of Balsas River	2 452 672	70 785	"	"	<u>A. pseudopunct.</u> <u>A. albimanus</u>	Aggres. of sprayed surfaces; intensive popul. movement, poor housing, partial resist. of <u>A. pseudop.</u>	"	Transmission decreased	"

a) Irregular cycles and dosifications; in 1968 and 1969 only one spraying cycle was carried-out due to financial problems.

Table 24 (Cont.)

AREAS WHERE PROGRESS DEPENDS ON THE APPLICATION OF NEW ATTACK MEASURES  
TO SOLVE TECHNICAL PROBLEMS

Country and area	Population (area with problems)	Area Km <sup>2</sup>	Insecticide		Principal vector	Causes of problem	Attack measures		Measures planned for 1973
			Kind used	Years of coverage			Applied in 1972	Results obtained	
<u>Mexico (Cont.)</u>									
10 - "Costa Chica" of Guerrero and Oaxaca coastal	585 916	34 064	DDT DLN	15	<u>A.pseudopunct.</u> <u>A. albimanus</u>	Agressions of sprayed surfaces; poor housing; temporary shelters and modification of houses; population movements; incipi- ent resistance	DDT spray. every 3 months; radical cure treatment of cases and colater. in positive locali- ties; field research on <u>P. falciparum</u> resistance	Transmission decreased; isolated cases of <u>P. falc.</u> were detected. The studies determined sensibility to chloroquine	Same as in 1972; No new measures to be applied
11 - Northeastern slope of the Golf of Mexico Oaxaca State	195 721	16 612	"	"	"	Internal population movem.; poor housing; aggress. of sprayed surfaces	Operations incre- ment; semestrial spray.; active find detect. in 100% of houses and Localit. visited bimonthly; radical cure treat.	Transmission decreased	"
12 - Tapachula-Suchiate	267 634	4 443	"	"	"	Partial resistance of <u>A. albimanus</u> to DDT, migration movements	Treat. of cases and colat.; Entomolog. studies were extend. to determine the magnitud of resist.	"	"
13 - Central part of Chiapas State	196 869	5 448	"	"	<u>A.pseudopunct.</u>	Population movem.; area with difficult accessibility, ag- gressions of spray. surfaces	Semestrial spray. with DDT; radical cure of cases and colaterals (2nd semester)	Transmission persists	"
Total	4 228 531	179 086							



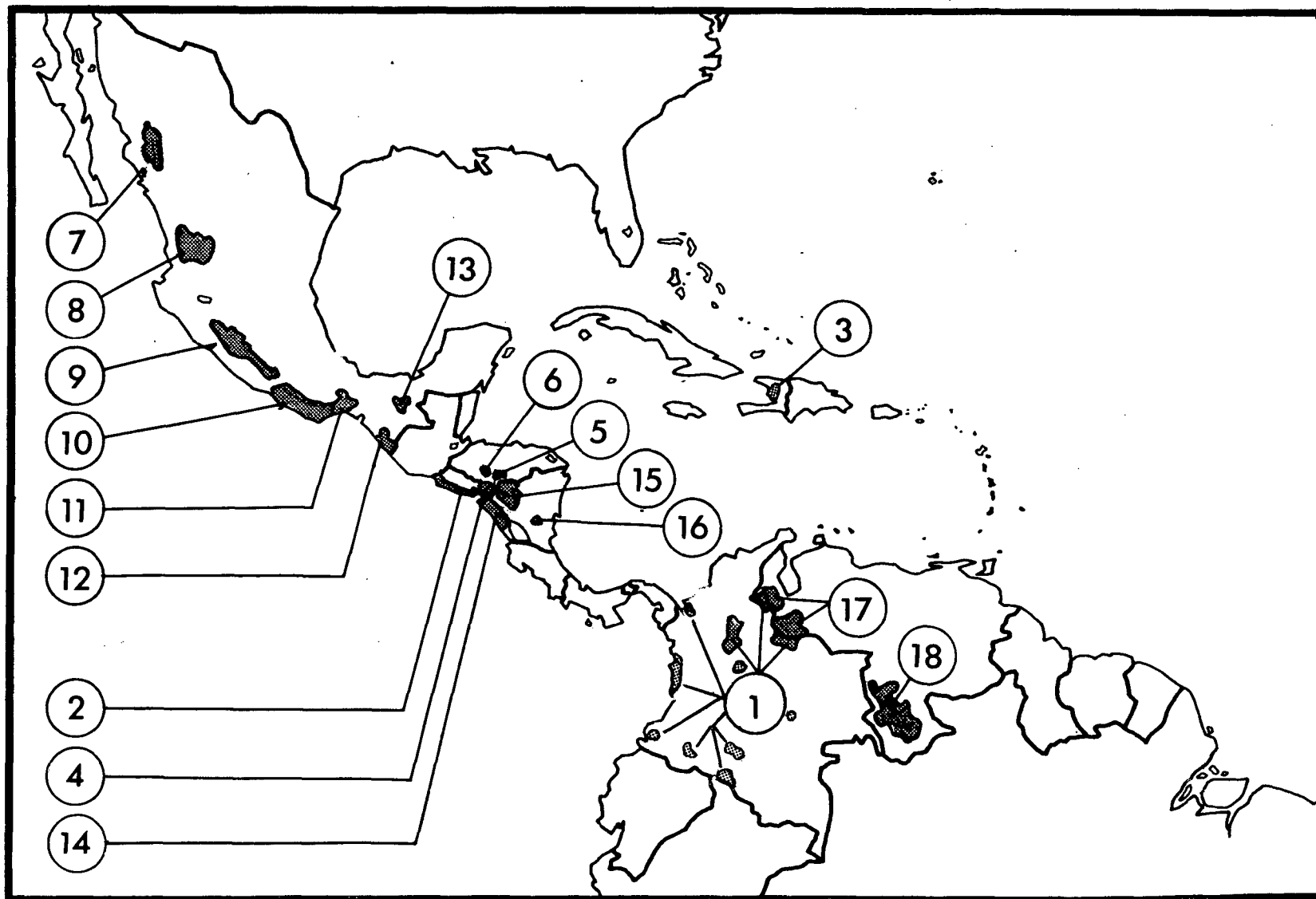
Table 24 (Cont.)

AREAS WHERE PROGRESS DEPENDS ON THE APPLICATION OF NEW ATTACK MEASURES  
TO SOLVE TECHNICAL PROBLEMS

Country and area	Population (area with problems)	Area Km <sup>2</sup>	Insecticide		Principal vector	Causes of problem	Attack measures		Measures planned for 1973
			Kind used	Years of coverage			Applied in 1972	Results obtained	
<u>Nicaragua</u>									
14 - Pacific Region Departments Chi- nandega, Leon, Ma- nagua, Carazo, Ma- saya, Granada and Rivas	978 132	16 023	DDT MAL Pro- poxur	4 4 2 3/4	<u>A. albimanus</u>	Vector resistance to DDT and Malathion	Quarterly spray. with Propoxur, 4 cycles a year	Favorable	Quarterly cycles with Propoxur; 4 and 3 cycles a year
15 - Central Region Dpts.: Nueva Sego- via, Madriz, Estelf, Matagalpa, Boaco Chontales	321 625	11 208	DDT MAL Pro- poxur	4 5 2 1/2	"	"	"	"	Quarterly spraying with Propoxur, 3 cycles a year
16 - Atlantic Region Zelaya Department (El Rama munici- pality)	25 146	150	DDT MAL Pro- poxur	4 1 1 1/2	"	Vector resistance to DDT	Quarterly spray. with Propoxur, 4 cycles a year	Very favorable	"
Total	1 324 903	27 381							
<u>Venezuela</u>									
17 - Occidental area	407 418	19 738	DDT	24	<u>A. nuneztovari</u>	Exophily of vector; migration of popu- lation; colonization	Intradomiciliary spraying with DDT; deposit of drugs in houses; radical cure to <u>P.falc.</u> infections	Focalization of areas with high malaria incidence	Intradom. spray. with DDT; peridom. fogging with organophosphorus insect.; mass drug treat.; deposit of chloroquine in houses; radical cure to <u>P.falciparum</u> infections
18 - Southern area	80 269	120 208	DDT	24	<u>A. darlingi</u>	"	Intradomiciliary spray. with DDT; deposit of drugs in houses; radical cure to <u>P.falc.</u> infections	"	"
Total	487 687	139 946							

MAP 4

**GEOGRAPHICAL DISTRIBUTION OF AREAS WITH TECHNICAL PROBLEMS  
(SHOWN IN TABLE No.24 )**



## B. Activities for solving technical problems

### 1. Use of other insecticides

Propoxur is being used to solve the problem of the persistence of transmission due to the vector's physiological resistance to DDT and Dieldrin. Propoxur was used in Nicaragua and El Salvador starting in 1970, and in Guatemala, Honduras, Costa Rica and Panama starting in 1971. The problem affected a small number of localities and was quickly eliminated in the two latter countries; in the other four, however, the problem of physiological resistance is more widespread and intense, affecting areas containing 25 per cent of the total population of their original malarious areas.

Initial results obtained with the use of Propoxur as an alternative means of attack in areas where the vector has shown physiological resistance to DDT have been favorable, a reduction of 54,696 cases (42.4 per cent) having been achieved from the 129,027 recorded in 1971, in El Salvador, Guatemala, Honduras and Nicaragua, the four countries with the most serious problem of physiological resistance.

In the "problem areas" of these four Central American countries, 88,784 cases were recorded in 1971 and only 37,869 in 1972. In other words, there was a 57 per cent decline in cases in areas protected with Propoxur. These areas received priority attention, for they had accounted for 75 per cent of all cases in 1971 in the malarious areas. The coverage with protective measures of other malarious areas in the four countries was thinner and this fact was reflected in the overall epidemiological situation.

Within the Central American area with technical problems, the number of cases declined by over 50 per cent in Honduras and Nicaragua and by less than 50 per cent in Guatemala and El Salvador, between 1971 and 1972.

The effectiveness of Propoxur varied from area to area in El Salvador. The number of cases decreased 54 per cent in the Departments of Usulután, San Miguel, and La Unión, in the eastern part of the country. In the central and western coastal zone, on the other hand, there was no decline in incidence, partly because the vector offered various degrees of resistance to the insecticide in 28 localities in six Departments. Studies of the extent and intensity of this resistance, as well as of its epidemiological significance, are continuing.

### 2. Larvicides and nebulization

The use of larvicides continued in 1972 in certain areas of Brazil, Guatemala, Haiti, Nicaragua and the Dominican Republic and the use of similar methods in selected urban areas of Honduras and Mexico was considered.

In Haiti and the Dominican Republic larvicides were used in conjunction with drainage projects.

The Government of Haiti and the United States Public Health service conducted a cooperative project to ascertain the effectiveness of techniques of aerial application of insecticides in ultra-low-volume in fighting malaria. The results of this experiment are being analyzed.

### 3. Engineering works and malaria

Ecological changes brought by the rapid expansion of artificial water reservoirs, irrigation projects and road projects for the development of rural areas in tropical regions include increases in the number of breeding places of anopheles mosquitoes, and hence the malaria-producing potential of those areas. If not prevented or controlled, the vector's increased density will favor the transmission of malaria and be a negative factor in the development of rural areas.

Efforts to improve coordination between the government agencies responsible for engineering projects and the health authorities were promoted during the year. The aim was to prevent the malaria that could result from such projects (irrigation systems, road building, land reclamation, etc.) and to stimulate cooperation in the elimination of existing malaria foci.

#### 4. Mass Drug Administration

Drugs were distributed in mass treatment in 1972 in Colombia, Guatemala, Haiti, Panama and Peru as a supplement to spraying operations using residual action insecticides.

In Colombia the method was used in colonization areas where transmission persists. The measures were effective, succeeding in holding transmission to low levels, in some areas. In other, however, the resistance of *P. falciparum* to the commonly used drugs (4-aminoquinolines) increased, depriving the program of much of its effectiveness.

In Guatemala the method of mass drug administration was used in selected areas where the application of DDT is still the principal method of attack. However, the efficacy of the combined measure has been reduced by resistance of the vector to chlorinated insecticides.

In Haiti, the use of mass drug administration was limited to control epidemic outbreaks which occurred following heavy rain-falls and inundation.

In Panama, mass drug administration was used to supplement other methods in an epidemic focus at Lake Gatún. The focus was eliminated and the treatment was therefore suspended.

In Peru, a combination of chloroquine, primaquine and pyrimethamine was used to protect Indian groups whose habits, particularly nomadism, prevent the use of insecticides or diminish its effectiveness.

Table 25 presents a country-by-country summary of the coverage achieved by this method of malaria control.

The distribution of kitchen salt mixed with antimalarial drugs, generally amodiaquine, continues being the chief attack measure on malaria in interior areas of French Guiana and Surinam. It is also used as a preventive measure in Guyana. The results of this method have been good in past years. In 1972, however, the coverage achieved, particularly in Surinam, was below that planned; consequently, the results were less than hoped for. During the year, 16,918 pounds of medicated salt were distributed to 2,500 inhabitants of French Guiana, and 355,100 pounds were distributed to 36,200 inhabitants of Surinam. In Guyana, 43,522 pounds of medicated salt were distributed to balata gatherers and their families and to inhabitants of some isolated localities of the Rupununi River Valley.

Table 25

## MASS DRUG PROGRAMS IN THE AMERICAS, 31 DECEMBER 1972

Country and name of area	Population	Area Km <sup>2</sup>	Drug used	Drug cycle	Number of cycles 31 Dec. 1972	Population treated (percentage)	Slides examined	Positive cases		
								<u>P. falciparum</u>	<u>P. vivax</u>	Total
<u>Colombia</u>										
Uraba	20 543	2 150	+ Chloroquine Primaquine	14 days	40 a)	75.8	1 960	380	82	462
Bajo Cauca	25 795	4 500			76	57.0	623	111	20	131
Catatumbo	8 328	1 200			48	69.1	341	2	12	14
Sarare	11 508	1 400			55	64.2	635	9	65	74
Putumayo	21 543	3 000			31	80.7	773	1	13	14
Total	87 717	12 250								
<u>Guatemala</u>										
Costa Sur	8 200	300	+ Chloroquine Primaquine	14 days	24	59.3	609	-	2	2
Alta Verapaz	11 700	280			24	83.0	955	-	20	20
Total	19 900	580								
<u>Haiti</u>										
Aquin-Cayes	74 611	...	+ Chloroquine Pyrimetham.	21 days	6	76.2	9 025	828	-	828
<u>Panama</u>										
Lago Gatun	1 707	50	+ Chloroquine Primaquine	14 days	24	...	18 205	335	3	338
<u>Peru</u>										
Bigote	5 213	60	+ Chloroquine Primaquine Pyrimethamine	Monthly	1	93.0	60	-	27	27
Chinchipe	16 818	150			1	91.0	83	...	...	...
Ene	3 200	640			3	97.7	4 622	-	390	390
Satipo	2 500	200			3	87.0	1 179	-	41	58 a)
Marañon	25 600	120 426			3	96.0	1 234	-	70	70
Total	53 331	121 476								

a) After the 40th coverage (October) it changed to monthly cycle. b) Includes 17 P. malariae.

### III. RESEARCH

Through specific projects or through counseling at the country, zone or regional level, the Organization continues to study problems affecting the progress of the program in various countries, to guide and coordinate research activities and to foster the interest of other agencies in the study and possible solution of these problems.

Activities conducted during the year included:

#### A. Evaluation of Insecticides

##### 1. Evaluation of Propoxur

In Pacific coast areas of Central America, efforts to evaluate the effectiveness of Propoxur in controlling A. albimanus that is resistant to DDT and organophosphorus insecticides continued. Results in the treated area were satisfactory: in 1972 a reduction of more than 50 per cent in the number of recorded cases, as compared to the preceding year, was achieved. But 28 localities in six Departments in which the vector showed various degrees of resistance to Propoxur were identified in the central and western coastal area of El Salvador. Other difficulties, such as the existence of surfaces that inactivate the insecticide when it is applied to them, were also discovered. Hence, the results in these areas were not encouraging.

##### 2. Technique of partial spraying

In view of the fumigating effect of Propoxur, an experiment in which 60 grams of the active substance were applied to each house in 35-day cycles was conducted in El Salvador. Unfortunately, the treated area coincided in part with the area in which the vector was found to be resistant to Propoxur. The incidence of malaria rose and efforts had to be concentrated on the study and control of this situation.

##### 3. Testing of other insecticides

Planning was begun for the testing of alternative insecticides for possible use in areas with multiple resistance as in El Salvador.

Preliminary studies undertaken with the Organization's support at the University of California at Riverside have shown that the level of cross resistance to Landrin (WHO-597) in Propoxur-resistant A. albimanus larvae from a colony grown from eggs collected in El Salvador is negligible. In addition, Landrin has displayed a high level of activity against adult mosquitoes.

Since Landrin has now gone through step IV in the WHO-established evaluation and testing program for new insecticides, arrangements for subsequent testing, to include entomological, toxicological and epidemiological observation, were begun during the year.

The United States Center for Disease Control, in cooperation with the Haitian Government and the Organization, conducted a field trial in Haiti to evaluate the potential usefulness of ultra-low-volume aerial application of malathion to control seasonal epidemic outbreaks of malaria in the Lake Miragoane region.

#### B. Research in Chemotherapy

Studies to determine the susceptibility of P. falciparum to the 4-aminoquinolines were conducted in Colombia and southern Surinam.

Tests were conducted in Brazil to determine the gametocidal and sporontocidal effect of primaquine and various combinations of primaquine with other antimalarial drugs in treating chloroquine-resistant strains of P. falciparum.

### C. Immunological Studies

The Organization continued its support for research by the Department of Preventive Medicine of New York University of techniques to immunize mammals against malaria infection.

PASB personnel cooperated with the Central American Research Station of the Center for Disease Control and the National Institutes of Health of the United States of America in research work on the application of serological techniques to the study of the epidemiology of malaria in El Salvador. In addition, preliminary work was done on a sero-epidemiological study of malaria in areas of Guyana which have been free of malaria for over five years and in two small foci where transmission still persists.

### D. Entomological Studies

Vector behavior was studied in El Salvador to detect possible barriers between insecticide-susceptible and insecticide-resistant populations. Studies were also undertaken to ascertain the scope and epidemiological significance of the resistance of *A. albimanus* to Propoxur in the Central American countries, and methods for establishing standard tests for vector susceptibility to Propoxur were studied.

The Organization continued to support genetic studies by the University of Illinois on South American vectors, as well as studies by the University of California at Riverside on selection mechanisms and on cross resistance to organophosphorus insecticides and carbamates.

### E. Research on the Economic Effects of Malaria

A study to determine the possible effects of malaria on a microeconomy involving some 300 farm families was conducted in Paraguay. Longitudinal data were collected for 20 months.

Coding of the data and preliminary processing of the most important information were completed in 1972. Analysis of these results and the grouping of data from various fields of interest into aggregate figures are underway.

### F. Research Promotion

The papers presented at the Inter-American Symposium on Malaria Research, held in San Salvador, Republic of El Salvador, November 1-4, 1971, under the auspices of the Government of El Salvador, the USPHS/CDC and PAHO/WHO, were published as a supplement to the September 1972 issue of the American Journal of Tropical Medicine and Hygiene.

#### IV. INTERNATIONAL COOPERATION

PAHO/WHO supports the continental program to eradicate malaria through the participation of full-time professional and technical personnel and short-term consultants. Table 26 indicates the number of officials in the categories of medical officer, sanitary engineer, inspector and expert in economics, laboratory work and administration, assigned to the countries during the 1970-1973 period.

Since 1958 PAHO/WHO has been providing antimalarial drugs for the presumptive treatment of febrile patients who arrive at information centers and for the radical cure of cases with positive microscopic diagnosis (Table 27). Medicated salt is the vehicle for distribution in two political units, while mass drug administration is the method applied in selected areas of five countries. (Table 25).

The PAHO/WHO contribution in 1972 also included the provision of certain means of transportation, equipment for entomological studies, cardboard tubes for the shipment of slides and supplies for special studies. For a research project on the epidemiology of malaria in problem areas, PAHO/WHO not only provided the supplies, but also defrayed the local expenses.

Coordination among national programs continued through frontier meetings and the periodic exchange of information.

In 1972 the Organization took part in inter-country meetings between Colombia and Venezuela; Ecuador and Peru; Bolivia and Brazil; Argentina and Paraguay, Argentina and Bolivia; Argentina, Bolivia and Paraguay; Colombia and Ecuador; and Brazil, French Guiana, Guyana and Surinam.

In 1972 UNICEF continued to use previously obligated funds to assist 12 malaria eradication programs. UNICEF also continued to support the development of basic health services in rural areas, which in turn benefits epidemiological surveillance.

The United Nations Development Program (UNDP) allotted funds for the employment of technical personnel in three countries (Ecuador, Mexico and Panama).

The United States Agency for International Development (AID) made grants to two countries and long-term loans to five countries for activities of the malaria eradication program. In addition, the Center for Disease Control (CDC) of the United States Public Health Service continued its malaria research in several countries, primarily in Central America, where it has a Research Center.

The Government of Venezuela continued to assist in the training of personnel at its "Escuela de Malariología y Saneamiento Ambiental" (School of Malariology and Environmental Sanitation) in Maracay, Aragua. The School of Public Health of the University of São Paulo, Brazil provided training in medical entomology, with emphasis on malaria and the national programs collaborated in the field training of personnel from other countries. These resources were used in training 11 candidates sponsored by the Organization. Besides providing facilities for training, the Government of Venezuela grants six fellowships for each course to candidates sent by PAHO.

Table 28 shows the contributions of PAHO, WHO and AID to eradication programs. Aid in the form of loans is not included.

At the request of the Governments of Central America and Panama, the Government of the Federal Republic of Germany donated 216,100 kilograms of Propoxur in 1972 for use in areas where the vector is resistant to DDT. This donation, which provided one-third of the programs' needs, together with the insecticide purchased by the Governments with national funds, permitted sufficient coverage of the problem areas to produce encouraging results, as indicated in Chapter III, dealing with special technical problems.



Table 26

PAHO/WHO FULL-TIME PROFESSIONAL AND TECHNICAL STAFF ASSIGNED TO COUNTRY, INTER-COUNTRY,  
AND INTER-ZONE MALARIA ERADICATION PROGRAMS IN THE AMERICAS, FROM 1970 TO MAY 1973\*

Country or other political or adminis- trative unit	Medical Officers				Sanitary Engineers				Sanitary Inspectors				Entomologists				Others			
	1970	1971	1972	1973	1970	1971	1972	1973	1970	1971	1972	1973	1970	1971	1972	1973	1970	1971	1972	1973
Argentina .....	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Bolivia .....	1	1	1	1	-	-	-	-	1	1	1	1	-	-	-	-	-	-	-	-
Brazil .....	5	4	4	4	1	1	1	1	3	3	1	1	2	1	1	1	2a)	1	-	-
Colombia .....	2	1	1	1	-	-	-	-	1	1	3	3	1	-	-	-	-	-	-	-
Costa Rica .....	1	1	1	1	-	-	-	-	1	1	1	1	-	-	-	-	-	-	-	-
Dominican Republic .....	1	1	1	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ecuador .....	1	1	1	1	-	-	-	-	2	1	1	1	-	-	-	-	-	-	-	-
El Salvador .....	2	2	1	1	1	1	1	1	1	1	1	1	-	1	1	1	-	-	-	-
Guatemala .....	2	1	1	1	1	1	1	1	1	1	-	-	-	-	-	-	-	-	-	-
Guyana .....	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-
Haiti .....	1	1	2	2	1	1	-	-	2	2	1	1	-	-	-	-	-	-	-	-
Honduras .....	1	1	1	1	-	-	-	-	1	1	1	1	-	-	-	-	-	-	-	-
Mexico .....	2	1	1	1	1	1	1	1	-	-	-	-	1	1	1	1	-	-	-	-
Nicaragua .....	2	2	2	2	-	-	-	-	2	2	2	2	-	-	-	-	-	-	-	-
Panama .....	1	2	2	1	1	1	1	1	1	1	1	-	-	-	-	-	-	-	-	-
Paraguay .....	1	1	1	1	1	1	1	1	2	1	1	1	-	-	-	-	-	-	-	-
Peru .....	1	1	1	1	1	1	1	1	1	1	-	-	-	-	-	-	-	-	-	-
Belize .....	-	-	-	-	-	-	-	-	1	1	1	1	-	-	-	-	-	-	-	-
Surinam .....	-	-	-	-	-	-	-	-	1	-	1	1	-	-	-	-	-	-	-	-
Inter-zone and inter- country projects.....	10	12	11	11	1	1	1	1	2	2	2	2	2	2	3	3	4b)	4b)	4b)	4b)
Total .....	34	33	32	31	9	9	8	8	24	20	18	17	6	5	6	6	6	5	4	4

\* From 1970 to 1972 as of 31 December of each year; 1973 up to May.

a) Administrative Officers.

b) One economist, two administrative officers and one laboratory technician.

Table 27

DRUGS PROVIDED BY PAHO/WHO TO MALARIA ERADICATION PROGRAMS IN THE AMERICAS, 1958-1972  
(In thousands of tablets)

Country or other political or adminis- trative unit	Total 1958-1971a)								1972					
	Chloro- quine 150 mg.	Primaquine		Pyri- methamine 25 mg.	Combined drug b)	Aspirin		Fanasil	Chloro- quine 150 mg.	Primaquine		Pyri- methamine 25 mg.	Combined drug b)	Fanasil
		15 mg.	5 mg.			0. 50 gr.	0. 20 g.			15 mg.	5 mg.			
Argentina .....	1 888	356	207	712	-	-	-	-	-	-	-	-	-	-
Bolivia .....	8 000	1 205	631	853	462	200	-	6	800	50	-	3	-	3
Brazil .....	111 735	1 664	825	220	1 801	-	-	137	9 000	350	150	20	78c)	35
Colombia .....	28 395	2 503	830	5 149	9 092	100	20	14	1 500	-	-	-	500	12
Costa Rica .....	5 694	993	417	213	1 385	227	81	-	500	-	-	-	-	-
Cuba .....	4 350	38	69	80	-	-	-	-	-	-	-	-	-	-
Dominican Republic .....	12 730	73	217	847	-	10	10	-	300	10	5	-	150	-
Ecuador .....	12 756	929	240	430	295	-	-	-	380	87	-	-	550d)	-
El Salvador .....	17 205	848	852	128	2 070	-	-	-	1 000	80	50	-	-	-
Guatemala .....	15 461	1 137	189	77	8 049	200	50	2	1 000	50	50	-	-	-
Guyana .....	787	261	92	316	-	30	-	19	-	7	6	22	-	6
Haiti .....	6 120	82	-	1 480	31 608	-	-	-	250	-	-	-	-	-
Honduras .....	13 945	1 584	1 235	88	1 290	-	-	-	-	-	-	-	-	-
Jamaica .....	879	18	-	288	50	-	-	-	-	-	-	-	-	-
Mexico .....	68 466	10 636	15 372	10 679	4 092	-	-	-	7 450	-	-	-	340	-
Nicaragua .....	10 999	1 548	2 155	156	6 933	-	-	-	-	-	-	-	-	-
Panama .....	6 090	1 004	473	292	1 695	-	-	10	450	20	-	50	10c)	10
Paraguay .....	10 112	256	118	68	60	-	-	6	600	-	-	-	16	2
Peru .....	23 456	1 259	573	1 767	2 340	433	40	-	1 000	130	75	500	1 065e)	-
Trinidad and Tobago....	815	940	419	121	400	112	20	-	-	-	-	-	-	-
Belize .....	440	39	35	6	22	61	79	-	50	2	2	-	-	-
Canal Zone .....	-	-	-	-	90	-	-	-	-	-	-	-	-	-
Dominica .....	90	1	1	45	-	40	-	-	-	-	-	-	-	-
French Guiana .....	160	21	20	16	48	-	-	-	-	-	-	-	-	-
Grenada .....	43	-	-	45	-	20	-	-	-	-	-	-	-	-
St. Lucia .....	68	1	-	70	-	36	-	-	-	-	-	-	-	-
Surinam f) .....	1 881	59	47	536	265	128	10	-	330	15	19	50	-	5
Total .....	362 565	27 455	25 017	24 682	72 047	1 597	310	194	24 210	801	357	645	2 709	73

a) Chloroquine, Primaquine and Pyrimethamine powder and Tricalcium phosphate were provided to different projects. b) Chloroquine/Primaquine (adult and infant size). c) Infant size. d) 50 000 tablets, infant size. e) 65 000 tablets, infant size. f) In addition there was also provided 800 Lbs. Amodiaquine powder and 1 500 Lbs. Tricalcium phosphate.

Table 28

**INTERNATIONAL CONTRIBUTIONS TO MALARIA ERADICATION PROGRAMAS IN THE AMERICAS  
1972 AND ESTIMATED 1973**

(U.S. Dollars)

Country or other political or adminis- trative unit	Date of initiation of total coverage	1972			1973 (estimated)		
		PAHO	WHO and WHO/TA	AID (USA) (fiscal year) <sup>a)</sup>	PAHO	WHO and WHO/TA	AID (USA) (fiscal year) <sup>a)</sup>
Argentina .....	Aug. 1959	-	-	-	1 000	-	-
Bolivia .....	Sep. 1958	52 737	-	-	52 463	-	-
Brazil .....	Aug. 1959	200 560	35 471	-	190 927	52 800	-
Colombia .....	Sep. 1958	90 358	8 940	-	94 884	-	-
Costa Rica .....	Jul. 1957	-	51 296	-	-	33 374	-
Dominican Republic ....	Jun. 1958	32 386	-	-	30 447	-	-
Ecuador .....	Mar. 1957	26 735	30 000	-	48 063	-	-
El Salvador .....	Jul. 1956	35 200	98 953	-	36 347	78 834	-
Guatemala .....	Aug. 1956	28 010	39 651	-	35 247	30 508	-
Guyana .....	Jan. 1947	346	-	-	1 000	-	-
Haiti .....	Jan. 1962	58 660	-	1 320 000	77 510	-	1 371 000
Honduras .....	Jul. 1959	-	49 281	-	-	58 488	-
Mexico .....	Jan. 1957	39 488	100 063	-	29 842	100 000	-
Nicaragua .....	Nov. 1958	49 976	59 093	-	46 252	55 648	-
Panama .....	Aug. 1957	22 395	85 602	-	28 547	30 576	-
Paraguay .....	Oct. 1957	78 003	-	23 117	77 110	-	31 334
Peru .....	Nov. 1957	65 728	14 031	-	62 394	-	-
Belize .....	Feb. 1957	26 242	27 058	-	20 405	-	-
French Guiana .....	Sep. 1963	-	-	-	5 000	-	-
Surinam .....	May 1958	29 491	18 338	-	-	41 315	-
Inter-country projects and general services ..		661 697	210 719	49 002	460 656	425 656	36 978
<b>Total .....</b>		<b>1 498 012</b>	<b>828 496</b>	<b>1 392 119</b>	<b>1 298 094</b>	<b>907 199</b>	<b>1 439 312</b>

a) AID loans are shown in Table 22.