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STATUS OF MALARIA PROGRAMS IN THE AMERICAS

XLI REPORT

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I. STATUS OF MALARIA IN THE WORLD

In 1991, some 90 countries or areas were considered malarious and more than 40% of the world population remained exposed to varying degrees of risk of contracting malaria. It is difficult to obtain exact information on the incidence of malaria worldwide because reporting is incomplete, particularly in the regions with high endemicity. It is estimated that the number of annual clinical cases is in the order of 300-500 millions. It is calculated that more than 90% of all clinical cases are found in the countries of tropical Africa.

In recent years, the number of cases of malaria reported has increased in the African Region, though reporting continues to be fragmentary and irregular. In the other WHO Regions, the total number of cases has not changed substantially in recent years. In 1991 5.6 million cases were reported, but the actual number is estimated to be about 4-5 times higher.

In light of the diversity and complexity of the technical, political, sociocultural, and economic factors that affect the transmission of malaria, it has been necessary to modify in all malarious areas the control strategies which were based on the application of a single type of intervention that did not consider the variety of risk factors related to various degrees of endemicity. The diversity of epidemiological situations associated with the transmission of malaria requires that the treatment of the disease be organized around realistic objectives, and include the application of diversified and complementary measures in relation to these factors, available resources and level of local development. Among the principal obstacles confronting malaria control and its prevention in high transmission areas are the following: a) poor hygiene and precarious living conditions; b) lack of economic resources; c) lack of knowledge of the biology and ecology of vectors, as well as of vector control measures; d) expansion of agricultural, mining, and forest development programs to new areas, with resulting increases in migration; e) insufficient or nonexistent health infrastructure in these new human settlements.

II. STATUS OF MALARIA IN THE AMERICAS

During 1992, the population of the Region of the Americas was estimated at 725.5 million inhabitants, of which 39.9% lived in areas with an ecological situation conducive to the transmission of malaria (Table 1). During the year, 1,187,316 parasitoscopically confirmed cases of malaria were reported, reflecting a decline in morbidity: from 437.8 cases per 100,000 population exposed to malaria in 1991, to 409.5 cases per 100,000 population in 1992 (Table 2). Last year (1992) was the first year since 1974 in which the overall epidemiological situation of malaria showed even a minor improvement, inasmuch as there had been a gradual increase in annual prevalence between 1974 and 1991.

In countries or territories of the Region showing no evidence of transmission (Table 3), with a total population of approximately 316.0 million inhabitants, 1,263 cases of malaria were reported. The majority were imported cases, and 12 of them were classified as introduced cases (Table 4).

In the 21 countries of the Region with evidence of malarious transmission, (Table 5 and 6) with a total of 420.6 million inhabitants of which 207 million live in originally malarious areas (potentially exposed to transmission). Although information is not complete for the entire year, 1,186,053 cases of malaria have been reported in these countries, yielding an Annual Parasitic Index (API) of 5.7 per 1,000 inhabitants exposed (Figure 1). This was a drop from 1991, since the API for that year was 6.2 per 1,000 inhabitants of the malarious areas.

The slight variability in the number of cases reported annually -approximately one million- poses some questions that the malaria prevention and control programs are considering within the context of analysis and review of the structure and strategy for the integration of programs into the local health services. The fact that the number of reported cases has reached a stable level suggests either that the number of susceptible persons exposed to transmission has stabilized or else that the capacity of malaria control programs has reached its operational limit in making parasitoscopic diagnoses. This would indicate that the programs are no longer successful in overcoming current infrastructure conditions (human and material resources) and do not achieve complete coverage of those areas with transmission.

An argument in support of the first possibility (Table 6) is that the proportion of infections of *P. falciparum* diagnosed by the services was 34.0% in 1991 and 34.4% in 1992. This would mean that the control measures are not achieving their objective of reducing transmission, either because new areas of primary transmission are opening up, or else because the number of existing areas of transmission is not being reduced. Furthermore, the fact that in 16 countries with evidence of transmission (except for Argentina, Brazil, French Guiana, Guyana, and Suriname) a sufficient quantity of drugs has been consumed for complete treatment (1,500 mg of 4-aminoquinolines) of 4,820,800 cases of malaria infection (Table 7) might be taken to indicate that the parasitoscopically diagnosed cases represent only 11.0% of all suspected clinical cases of malaria. This would mean that malaria prevention and control programs in these 16 countries used at least 8.0 times more 4-aminoquinolines than the number of confirmed cases (Table 8).

In addition, even considering that the excess used would have been consumed in part for "presumptive treatment" by administering 600 mg to every individual of the 5,621,469 slides taken, there would still be excess administration of this drug, sufficient for the complete treatment of 2,041,945 cases of malaria in the 16 reporting countries (Tables 7 and 8).

Since these figures do not include other malaria drugs used in the programs (Fansidar, mefloquine, halofantrine, combined treatments, etc.), nor are malaria drugs used in other units of the health sector -whether that be public, private, or military, from which PAHO/WHO does not receive information, it could be estimated that the 1,186,951 cases of malaria reported in 1992 represent only a small fraction of what might be the real number of cases in the Americas-between 4.5 and 9.3 million (or 3.8 to 7.9 times more).

In summary, the information contained in this report does not necessarily reflect the situation of malaria distribution in the Americas, but rather the official reporting of cases of malaria that have been considered as such by the specialized programs in each country.

Table 1

POPULATION OF MALARIOUS AREAS OF THE AMERICAS
1958 - 1992
(In thousands)

Inhabitants in originally malarious areas						
Year	Malaria transmission			Prep. phase or program not started	Total	Total Population
	Low	Moderate	High			
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	145,389	455,527
1966	69,760	36,128	43,369	17,212	166,469	463,649
1967	70,720	41,581	44,766	12,834	169,901	474,868
1968	72,441	45,812	56,234	217	174,704	484,664
1969	72,757	46,987	56,375	206	176,325	491,483
1970	80,770	40,518	59,807	162	181,257	505,819
1971	81,306	43,644	60,396	146	185,492	513,544
1972	86,634	42,016	61,645	153	190,448	524,774
1973	87,969	45,535	61,915	109	195,528	535,109
1974	91,527	46,042	63,130	56	200,755	544,865
1975	99,405	44,633	61,834	-	205,872	555,676
1976	101,068	48,813	61,205	-	211,086	565,249
1977	104,567	50,610	60,373	-	215,550	576,942
1978	105,611	59,734	54,808	-	220,153	587,704
1979	113,092	57,280	55,989	-	226,361	600,263
1980	114,620	58,087	58,659	-	231,366	610,021
1981	117,042	59,962	62,256	-	239,260	627,375
1982	118,338	62,028	64,941	-	245,307	635,954
1983	119,175	66,970	63,182	-	249,327	639,212
1984	124,408	68,372	64,496	-	257,276	659,535
1985	124,086	67,092	68,659	-	259,837	665,777
1986	116,143	43,717	103,500	-	263,371	662,983
1987	117,310	42,334	108,633	-	268,277	672,384
1988	124,250	46,048	109,927	-	280,225	703,358
1989	126,666	45,309	113,419	-	285,394	715,994
1990	120,980	47,481	110,139	-	278,600	698,199
1991	143,239	66,504	71,381	-	281,124	721,256
1992	134,089	103,885	51,974	-	289,948	725,554

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Table 2
MALARIA MORBIDITY IN THE AMERICAS
1958 - 1992

YEAR	Population (in thousands)		Blood slides			Morbidity per 100,000 inhabitants	
	Total countries	Malarious areas	Examined	Positives	Per- centage	Total countries	Malarious areas
1958	387,276	135,409	1,716,103	56,705	3.30	14.64	41.88
1959	394,606	145,920	2,749,117	75,612	2.75	19.16	51.82
1960	400,500	143,586	3,955,149	79,998	2.02	19.97	55.71
1961	416,008	147,292	5,341,004	99,639	1.87	23.95	67.65
1962	427,919	153,742	7,221,367	177,089	2.45	41.38	115.19
1963	434,950	152,021	7,903,156	227,026	2.87	52.20	149.34
1964	447,666	158,642	8,156,290	254,572	3.12	56.87	160.47
1965	455,527	146,389	9,069,950	241,462	2.66	53.01	164.95
1966	463,649	166,469	11,797,983	333,280	2.82	71.88	200.21
1967	474,868	169,901	11,609,228	369,388	3.18	77.79	217.41
1968	484,664	174,704	12,522,696	282,773	2.26	58.34	161.86
1969	491,483	176,325	12,179,190	323,782	2.66	65.88	183.63
1970	505,819	181,257	9,925,162	344,170	3.47	68.04	189.88
1971	513,544	185,492	10,134,212	338,416	3.34	65.90	182.44
1972	524,774	190,448	9,695,953	284,813	2.94	54.27	149.55
1973	535,109	195,528	9,400,682	290,276	2.98	52.38	143.34
1974	544,865	200,755	8,997,318	269,003	2.99	49.37	134.00
1975	555,676	205,872	9,276,878	356,692	3.84	64.19	173.26
1976	565,249	211,086	9,352,775	379,364	4.06	67.11	179.72
1977	576,942	215,550	9,274,480	398,925	4.30	69.14	185.07
1978	587,704	220,153	9,493,751	468,923	4.94	79.79	213.00
1979	600,263	226,361	8,530,653	515,271	5.97	84.47	227.63
1980	610,021	231,366	8,943,369	602,836	6.74	98.82	260.56
1981	627,375	239,260	9,100,529	629,629	6.92	100.36	263.16
1982	635,954	245,307	8,826,418	715,177	8.10	112.46	291.54
1983	639,212	249,327	9,113,611	830,700	9.11	129.96	333.18
1984	659,535	257,276	9,422,827	931,356	9.88	141.21	362.01
1985	665,777	259,838	9,485,203	910,917	9.60	136.82	350.57
1986	662,983	263,371	10,070,388	950,570	9.44	143.38	360.92
1987 a)	672,941	268,217	9,764,285	1,018,864	10.43	151.40	379.87
1988 a)	703,370	280,758	10,092,472	1,120,040	11.10	159.24	398.93
1989 a)	715,994	285,394	9,638,847	1,113,764	11.55	155.55	390.25
1990 a)	698,741	278,600	9,459,912	1,045,808	11.06	149.67	375.38
1991 a)	721,256	281,124	9,732,930	1,230,671	12.64	170.63	437.77
1992 a)	725,564	289,948	9,373,323	1,187,316	12.67	163.64	409.49

a) Information of some countries is provisional and incomplete

Table 3

 STATUS OF MALARIA PROGRAMS IN THE AMERICAS, 1992
 (By population)

Countries (by geographical regions)	Population of originally malarious areas									
	Total Population	Total malarious areas		Areas with low transmission		Areas with moderate transmission		Areas with high transmission		
	a)	Total	%	Total	%	Total	%	Total	%	
Anguilla	8 b)	-	-	-	-	-	-	-	-	
Antigua	77 b)	-	-	-	-	-	-	-	-	
Antillas Neerlandesa	195 c)	-	-	-	-	-	-	-	-	
Bahamas	262 b)	-	-	-	-	-	-	-	-	
Barbados	256 b)	-	-	-	-	-	-	-	-	
Bermuda	58 c)	-	-	-	-	-	-	-	-	
Canada	26,947 b)	-	-	-	-	-	-	-	-	
Cuba	10,822	3,683 d)	34.03	3,683 e)	100.00	-	-	-	-	
Chile	12,748	335	2.63	335	100.00	-	-	-	-	
Dominica	83 b)	18 d)	21.69	18 e)	100.00	-	-	-	-	
Estados Unidos de Am	252,916 b)	71,636 d)	28.32	71,636 e)	100.00	-	-	-	-	
Grenada	94 b)	34 d)	36.17	34 e)	100.00	-	-	-	-	
Guadalupe	347 b)	339 d)	97.69	339 e)	100.00	-	-	-	-	
Islas Caiman	27	-	-	-	-	-	-	-	-	
Islas Malvinas	2 c)	-	-	-	-	-	-	-	-	
Islas Turcas y Caico	10 b)	-	-	-	-	-	-	-	-	
Islas Virgenes (EUA)	120 d)	102	85.00	102 e)	100.00	-	-	-	-	
Islas Virgenes (R. U)	13 b)	-	-	-	-	-	-	-	-	
Jamaica	2,450	2,083 d)	85.02	2,083 e)	100.00	-	-	-	-	
Martinica	345 b)	208 d)	60.29	208 e)	100.00	-	-	-	-	
Montserrat	11 b)	-	-	-	-	-	-	-	-	
Puerto Rico	3,555 b)	3,555 d)	100.00	3,555 e)	100.00	-	-	-	-	
San Cristobal-Nevis	44 b)	-	-	-	-	-	-	-	-	
San Pedro y Miquelon	6 c)	-	-	-	-	-	-	-	-	
San Vicente	120 b)	-	-	-	-	-	-	-	-	
Santa Lucia	135	118 d)	87.41	118 e)	100.00	-	-	-	-	
Trinidad y Tabago	1,234	1,178 d)	95.46	1,178 e)	100.00	-	-	-	-	
Uruguay	3,130 b)	-	-	-	-	-	-	-	-	
México	84,368	43,578	51.65	-	-	43,578	100.00	-	-	
Belice	188	188	100.00	65	34.57	51	27.13	72	38.30	
Costa Rica	3,160	877	27.75	-	-	755	86.09	122	13.91	
El Salvador	5,394	4,866	90.21	-	-	-	-	4,866	100.00	
Guatemala	9,745	3,959	40.63	-	-	-	-	3,959	100.00	
Honduras	5,018	3,924	78.20	-	-	-	-	3,924	100.00	
Nicaragua	4,131	4,131	100.00	815	19.73	2,543	61.56	773	18.71	
Panama	2,466	2,372	96.19	-	-	2,145	90.43	227	9.57	
Haití	5,360	5,360	100.00	-	-	-	-	5,360	100.00	
Rep. Dominicana	7,536	7,371	97.81	7,214	97.87	53	0.72	104	1.41	
Guayana Francesa	115	115	100.00	106	92.17	-	-	9	7.83	
Guyana	756	756	100.00	-	-	-	-	756	100.00	
Suriname	420	302	71.90	267	88.41	6	1.99	29	9.60	
Brasil	149,030	64,208	43.08	16,884	26.30	25,236	39.30	22,088	34.40	
Bolivia	6,344	2,758	43.47	-	-	-	-	2,758	100.00	
Colombia	34,198	23,758	69.47	-	-	21,950	92.39	1,808	7.61	
Ecuador	9,991	5,891	58.96	3,662	62.16	714	12.12	1,515	25.72	
Peru	22,454	7,704	34.31	5,082	65.97	974	12.64	1,648	21.39	
Venezuela	20,249	16,321	80.60	15,618	95.69	-	-	703	4.31	
Argentina	34,107	4,332	12.70	-	-	4,226	9,755	106	2.45	
Paraguay	4,519	3,888	86.04	1,087	27.96	1,654	42.54	1,147	29.50	
T o t a l	725,564	289,948	39.96	134,089	46.25	103,885	35.83	51,974	17.93	

a) Population in thousands. b) Provisional population figures estimated by PAHO/Technical Information System. c) Population of 1990, estimated by PAHO/Technical Information System. d) Estimated figure, based on the total population figure. e) Population living in areas where malaria eradication has been registered by PAHO/WHO.

Table 4

BLOOD SLIDES EXAMINED AND WITH PLASMODIA, BY GEOGRAPHICAL SUB-REGIONS
ACCORDING TO LEVELS OF TRANSMISSION, 1992

Countries (By geographical sub-region) *	TOTAL		Low transmission		Transmission controlled		High transmission		Non-malarious areas	
	Blood slides		Blood slides		Blood slides		Blood slides		Blood slides	
	Examined	Positive	Examined	Posit.	Examined	Posit.	Examined	Posit.	Examined	Positive
Canada	...	402	-	-	-	-	-	-	-	402
Cuba	430,031	13	430,031	13	-	-	-	-	-	-
Chile	0	0	0	0	0	0	0	0	0	0
Dominica	12	0	12	0	-	-	-	-	-	-
United States	...	831	...	831	...	...	...	...	...	...
Grenada	...	...	...	...	...	...	...	...	...	...
Guadeloupe	...	...	...	...	...	...	...	...	...	...
Jamaica	6	6	6	6	-	-	-	-	-	-
Martinica	...	...	...	...	...	...	...	...	...	...
Santa Lucia	1	1	1	1	-	-	-	-	-	-
Trinidad y Tabago	10	10	10	10	-	-	-	-	-	-
Mexico	1,668,729	16,170	-	-	1,668,729	16,170	-	-	-	-
Belize	24,135	5,341	-	-	-	-	24,135	5,341	-	-
Costa Rica a)	105,131	6,951	-	-	70,085	5,922	34,287	717	759	312
El Salvador	202,446	4,539	-	-	-	-	202,446	4,539	-	-
Guatemala	396,171	57,560	-	-	-	-	396,171	57,560	-	-
Honduras	471,950	70,838	-	-	-	-	471,950	70,838	-	-
Nicaragua	381,715	26,866	-	-	-	-	381,715	26,866	-	-
Panama	308,359	727	-	-	135,918	184	172,441	543	-	-
Haiti b)	37,957	13,457	-	-	-	-	37,957	13,457	-	-
Dominican Rep.	299,549	698	254,284	528	13,737	47	31,528	123	-	-
French Guiana	56,925	4,072	26,045	713	3,687	83	27,193	3,276	-	-
Guyana	159,108	39,702	30,128	8,384	11,491	2,248	117,489	29,070	-	-
Suriname	13,799	1,404	34	3	-	-	13,765	1,401	-	-
Brazil c)	2,955,196	609,860	41,734	1,327	401,797	2,582	2,491,465	602,473	20,200	3,478
Bolivia	125,414	24,486	-	-	34,468	3,916	90,946	20,570	-	-
Colombia	736,498	184,023	57,197	1,404	52,837	5,230	626,464	177,389	-	-
Ecuador	377,321	41,089	-	-	-	-	376,853	41,039	468	50
Peru a)	123,147	54,922	32,455	5,148	14,676	7,206	76,016	42,568	-	-
Venezuela c)	336,571	21,416	213,312	11,973	-	-	121,541	9,114	1,718	329
Argentina	13,619	643	7,148	340	-	-	6,461	293	10	10
Paraguay	149,523	1,289	7,390	8	55,669	39	86,239	1,232	225	10
T O T A L	9,373,323	1,187,316	1,099,787	30,689	2,463,094	43,627	5,787,062	1,108,409	23,380	4,591

* Countries without malaria transmission are included in one group, not by geographic region.

... No information available.

a) (COR & PER) Information up to September. b) (HAI) Information up to June. c) Provisional information.

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Table 5

MALARICOMETRIC RATES OF 21 COUNTRIES OF THE AMERICAS
CON PROGRAMAS ACTIVOS DE MALARIA

Year	Total Population	Blood slides examined					Sprayings		
		Number	ABER	Positives	API	P. falc. v Assoc.	AFI	Number of sprayings	HSR
		(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)
1960	183,770	2,531,566	1.38	71,138	0.39	19,879	0.11	13,148,306	71.55
	187,952	3,713,353	1.98	79,048	0.42	22,668	0.12	13,726,707	73.03
	193,493	5,019,034	2.59	133,161	0.69	31,681	0.16	12,170,333	62.90
	199,273	6,703,183	3.36	173,570	0.87	49,932	0.25	13,922,121	69.86
	205,362	7,388,147	3.60	225,731	1.10	81,743	0.40	14,968,414	72.89
1965	210,859	7,737,428	3.67	255,130	1.21	76,937	0.36	13,995,317	66.37
	216,906	8,635,009	3.98	243,259	1.12	82,372	0.38	12,363,227	57.00
	222,629	10,813,817	4.86	332,599	1.49	98,597	0.44	11,498,910	51.65
	228,762	10,464,355	4.57	366,346	1.50	98,932	0.43	13,363,486	58.42
	235,068	11,473,186	4.88	280,063	1.19	80,816	0.34	14,293,242	60.80
1970	241,652	11,178,193	4.63	320,383	1.33	90,506	0.37	15,065,288	62.34
	250,465	9,184,108	3.67	339,825	1.36	86,757	0.35	16,697,301	66.67
	257,600	9,449,291	3.67	335,290	1.30	104,643	0.41	15,656,006	60.78
	264,763	9,036,489	3.41	284,180	1.07	106,658	0.40	17,486,151	66.04
	271,756	8,778,033	3.23	280,044	1.03	118,764	0.44	16,209,949	59.65
1975	279,501	8,500,069	3.04	268,700	0.96	88,702	0.32	14,070,933	50.34
	290,670	8,863,987	3.05	356,196	1.23	101,307	0.35	13,296,870	45.75
	298,121	9,005,812	3.02	378,651	1.27	113,828	0.38	11,423,543	38.32
	305,682	8,929,851	2.92	398,290	1.30	149,063	0.49	10,185,057	33.32
	313,091	9,143,761	2.92	468,038	1.49	141,259	0.45	9,963,092	31.82
1980	320,522	8,280,680	2.58	514,110	1.60	178,807	0.56	9,589,074	29.92
	328,492	8,576,170	2.61	599,959	1.83	194,485	0.59	9,545,805	29.06
	338,202	8,622,478	2.55	635,877	1.88	207,309	0.61	8,084,109	23.90
	346,237	8,453,319	2.44	713,878	2.06	223,617	0.65	5,905,423	17.06
	354,187	8,969,388	2.53	829,546	2.34	311,161	0.88	4,771,231	13.47
1985	362,266	9,006,858	2.49	929,891	2.57	292,422	0.81	4,458,556	12.31
	370,194	8,781,416	2.37	909,162	2.46	283,019	0.76	4,824,022	13.03
	379,376	8,972,835	2.37	948,906	2.50	323,194	0.85	4,670,077	12.31
	386,635	8,675,158	2.24	1,016,327	2.63	371,002	0.96	4,712,369	12.19
	394,965	8,990,281	2.28	1,118,132	2.83	409,526	1.04	5,775,247	14.62
1990	403,349	8,595,096	2.13	1,111,732	2.76	357,730	0.89	5,482,588	13.59
	409,143	8,647,095	2.11	1,044,069	2.55	365,934	0.89	4,933,155	12.06
	416,830	9,198,128	2.21	1,229,527	2.95	417,864	1.00	4,576,866	10.98
1992	420,553	8,943,263	2.13	1,186,053	2.82	408,323	0.97	4,432,398	10.54

- a) PAHO estimated population in thousand of inhabitants, Technical Information System. The population of the last years for some countries was based on the "UN. Population Division of the UN Secretariat, World Population Prospects: The 1992 Revision." b) Number of thick blood films examined during the year. c) ABER = Annual Blood Examination Rate, per 100 inhabitants. d) Number of positive slides.. i.e. showing plasmodium in at least 1000 microscopic fields. e) API = Annual Blood Parasite Index, per 1,000 inhabitants. f) Number of slides showing P. falciparum and other associated plasmodia. g) AFI = Annual P. falciparum Index during the year, per 1,000 inhabitants. h) Number of house sprayings during the year, regardless of cycles and insecticides. i) HSR = House Spray Rate, per 1,000 inhabitants.

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Figure 1

MALARIOMETRIC RATES OF 21 COUNTRIES OF THE AMERICAS, ABER and API

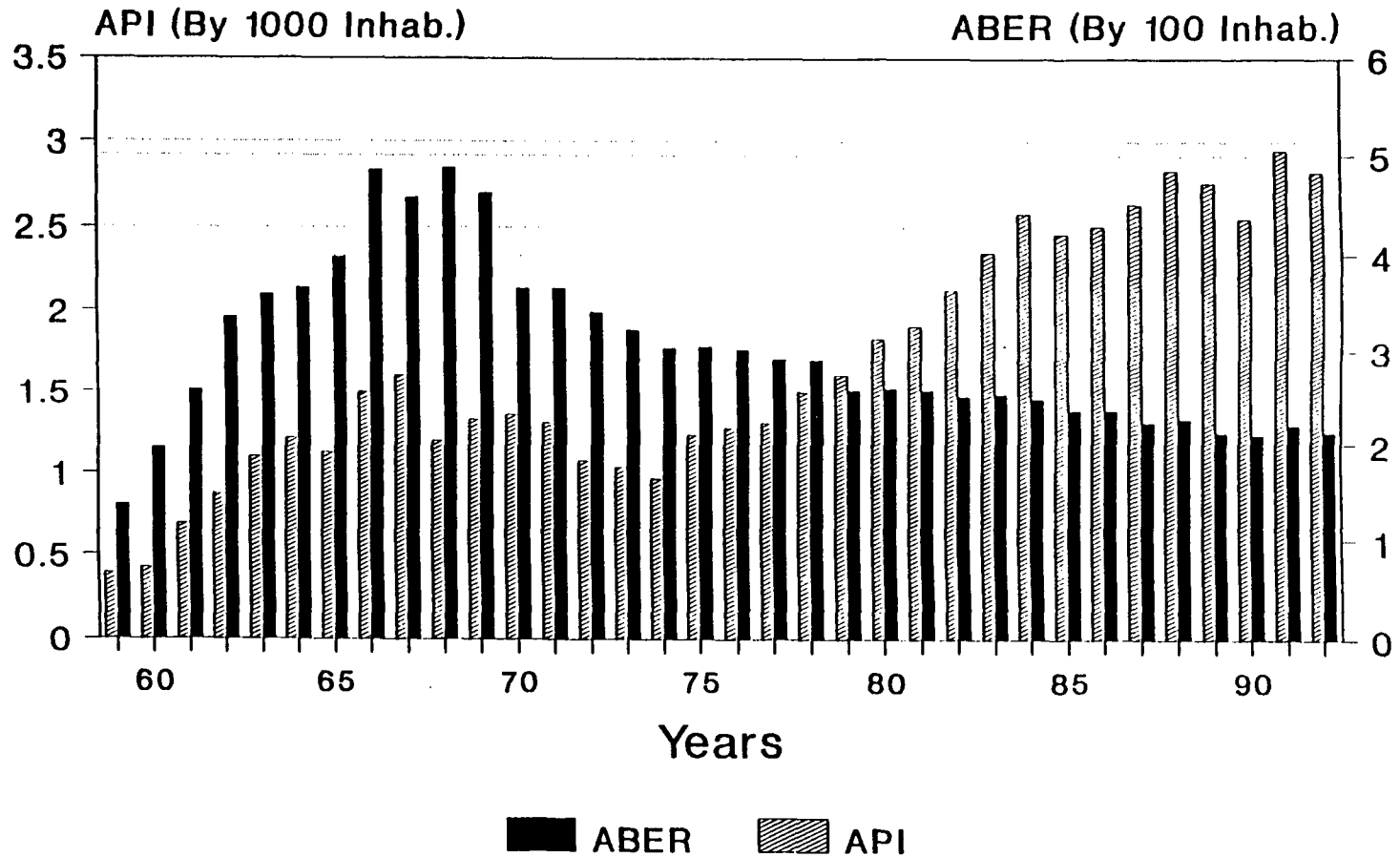


Table 6

EPIDEMIOLOGICAL SITUATION OF 21 COUNTRIES WITH ACTIVE MALARIA PROGRAMS, 1992

Countries (by geographical sub-regions)	Population malarious areas (a)	Blood slides		Species of parasites			Epidemiological indicators *			
		Exam	Posit.	P. falc & mixed	P. vivax	P. mal.	ABER	SPR	API	% P. falc. & mixed
Mexico	43,578	1,668,729	16,170	129	16,041	-	3.83	0.97	0.37	0.80
Belize	188	24,135	5,341	165	5,175	1	12.84	22.13	28.41	3.09
Costa Rica b)	877	105,131	6,951	16	6,935	-	11.99	6.61	7.93	0.23
El Salvador	4,866	202,446	4,539	6	4,533	-	4.16	2.24	0.93	0.13
Guatemala	3,959	396,171	57,660	1,480	56,080	-	10.01	14.53	14.54	2.57
Honduras	3,924	471,950	70,838	1,216	69,622	-	12.03	15.01	18.05	1.72
Nicaragua	4,131	381,715	26,866	2,192	24,674	-	9.24	7.04	6.50	8.16
Panama	2,372	308,359	727	113	614	-	13.00	0.24	0.31	15.54
Sub-total	20,317	1,889,907	172,822	5,188	167,633	1	9.30	9.14	8.51	3.00
Haiti c)	5,360	37,957	13,457	13,457	-	-	0.71	35.45	2.51	100.00
Rep. Dominicana	7,371	299,549	698	694	4	-	4.06	0.23	0.09	99.43
Sub-total	12,731	337,506	14,155	14,151	4	0	2.65	4.19	1.11	99.97
French Guiana	115	56,925	4,072	2,796	1,151	125	49.50	7.15	35.41	68.66
Guyana	756	159,108	39,702	23,871	15,831	-	21.05	24.95	52.52	60.13
Suriname	302	13,799	1,404	1,326	25	53	4.57	10.17	4.65	94.44
Sub-total	1,173	229,832	45,178	27,993	17,007	178	19.59	19.66	38.51	61.96
Brazil d)	64,208	2,955,196	609,860	267,054	342,650	156	4.60	20.64	9.50	43.79
Bolivia	2,758	125,414	24,486	2,757	21,729	-	4.55	19.52	8.88	11.26
Colombia	23,758	736,498	184,023	69,274	114,690	59	3.10	24.99	7.75	37.64
Ecuador	5,891	377,321	41,089	15,970	25,119	-	6.41	10.89	8.97	38.87
Peru b)	7,704	123,147	54,922	793	54,129	-	1.60	44.60	7.13	1.44
Venezuela e)	16,321	336,571	21,416	5,004	16,365	47	2.06	6.36	1.31	23.37
Sub-total	56,432	1,698,951	325,936	93,798	232,032	106	3.01	19.18	5.78	28.78
Argentina	4,332	13,619	643	-	643	-	0.31	4.72	0.15	0.00
Paraguay	3,888	149,523	1,289	10	1,279	-	3.85	0.86	0.33	0.78
Sub-total	8,220	163,142	1,932	10	1,922	0	1.98	1.18	0.24	0.52
T O T A L	206,659	8,943,263	1,186,053	408,323	777,289	441	4.33	13.26	5.74	34.43

* ABER = Annual Blood Examination Rate. SPR = Slide Positive Rate. API = Annual Parasite Index. Aug/30/93
P. falc. = Plasmodium falciparum
P. mal. = Plasmodium malariae

a) Population in thousand of inhabitants. b) (COR & PER) Information up to September. c) (HAI) Information up to June.
d) (BRA) Provisional information. e) (VEN) Some information is estimated.

Table 7

**FIRST LINE ANTIMALARIAL DRUGS USED BY THE
MALARIA CONTROL PROGRAMS IN 16 COUNTRIES OF THE AMERICAS IN 1992
(In thousands of tablets)**

COUNTRIES BY SUBREGIONS	4-AMINOQUINOLINES @ 150 mg BASE	NUMBER OF COMPLETE TREATMENT FOR EVERY DIAGNOSED CASE
BELIZE	70.0	≤ 1:1
COSTA RICA	1,439.0	20:1
EL SALVADOR	2,848.0	62:1
GUATEMALA	6,500.5	10:1
HONDURAS	3,593.3	04:1
MEXICO	7,815.0	47:1
NICARAGUA	9,155.0	33:1
PANAMA	339.0	45:1
HAITI	3,331.0	24:1
DOMINICAN REPUBLIC	1,012.2	15:1
BOLIVIA	1,220.0	04:1
COLOMBIA	3,743.7	01:1
EQUATOR	1,708.0	03:1
PERU	1,875.0	02:1
VENEZUELA	2,867.1	12:1
PARAGUAY	691.4	53:1
TOTAL	48,208.2	

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Table 8

ANTIMALARIAL DRUGS USED IN 1992, AND ESTIMATED FOR 1993, IN 21 COUNTRIES OF THE AMERICAS
(In thousands of tablets)

Countries (by geographical regions)	Chloroquine/Primaquine combined										Pyrimethamine 25 mg	
	Chloroquine 150 mg.		Primaquine 15 mg		Primaquine 05		Adult doses		Infant doses		1992	1993
	1992	1993 a)	1992	1993 a)	1992	1993 a)	1992	1993 a)	1992	1993 a)	1992	1993 a)
Mexico	7,815.8	6,861.8	1,166.1	874.8	1,943.4	1,457.6	-	-	-	-	-	-
Belize	70.0	75.0	50.0	50.0	40.0	40.0	-	-	-	-	-	-
Costa Rica b)	808.0	1,000.0	101.0	120.0	71.0	100.0	626.0	2,271.0	10.0	20.0	-	-
El Salvador	310.0	50.0	-	-	5.0	5.0	2,288.5	2,500.0	499.0	500.0	-	-
Guatemala	2,750.6	6,600.0	1,357.9	1,100.0	885.2	1,100.0	3,187.0	1,800.0	1,126.0	187.0	-	-
Honduras	3,693.3	3,962.6	475.9	523.6	470.5	517.5	-	-	-	-	-	-
Nicaragua	9,155.0	7,298.0	2,670.0	3,123.0	852.0	942.6	-	-	-	-	-	-
Panama	143.0	150.0	95.0	150.0	118.0	100.0	156.0	250.0	80.0	50.0	333.0	500.0
Haiti	3,331.0	...	10.0	...	-	-	-	-	-	-	-	-
Dominican Rep.	750.0	857.0	96.9	100.8	-	-	262.2	299.7	-	-	-	-
French Guiana	320.0	...	-	-	-	-	-	-	-	-	-	-
Guyana	3.5 c)	7.0 c)	4.0	8.0	1.0	3.0	-	-	-	-	-	-
Suriname	41.0	80.0	23.0	20.0	3.0	-	-	-	-	-	-	-
Brazil d)	4,609.0	...	3,385.8	...	1,451.4	...	-	-	-	-	-	-
Bolivia	1,220.0 c)	1,220.0 c)	350.0	350.0	50.0	50.0	-	-	-	-	26.0	25.0
Colombia	2,803.0 c)	5,000.0 c)	1,292.1	2,500.0	20.7	75.0	940.7	500.0	-	-	70.7	50.0
Ecuador	1,515.0	3,000.0	150.0	200.0	25.0	25.0	193.0	-	-	-	-	-
Peru b)	1,875.0	2,000.0	1,653.0	1,500.0	800.0	800.0	-	-	-	-	-	-
Venezuela d)	1,815.0 c)	11,125.0	418.0	825.0	80.6	176.0	1,037.7	2,178.0	28.8	600.0	418.0	825.0
Argentina	11.2	50.0	9.7	40.0	3.1	20.0	-	-	-	-	-	-
Paraguay	475.0	360.0	55.3	20.0	46.2	10.0	188.0	...	56.9	...	-	-
T O T A L	43,414.3	48,676.4	13,363.7	11,505.1	6,866.1	5,421.7	8,879.1	9,798.7	1,800.7	1,357.0	846.7	1,400.0

... No information available.

a) Estimation by the countries. b) (COR & PER) Information up to September.

c) Includes Amodiaquine 150 mg. d) Provisional figures.

Table 8 (Pag. 2)

ANTIMALARIAL DRUGS USED IN 1992, AND ESTIMATED FOR 1993, IN 21 COUNTRIES OF THE AMERICAS
(In thousands of tablets)

Countries (by geographical regions)	Sulfadoxina/Pyrimo Fansidar		Fansil 500 mg		Mefloquine		Quinine Sulphate 500 mg.		Quinine Ampoules		Quinine capsuls	
	1992	1993 a)	1992	1993 a)	1992	1993 a)	1992	1993 a)	1992	1993 a)	1992	1993 a)
México	-	-	-	-	-	-	-	-	-	-	-	-
Belize	-	-	-	-	-	-	-	-	-	-	-	-
Costa Rica	-	-	-	-	-	-	-	-	-	-	-	-
El Salvador	-	-	-	-	-	-	-	-	-	-	-	-
Guatemala	-	-	-	-	-	-	-	-	-	-	-	-
Honduras	-	-	-	-	-	-	-	-	-	-	-	-
Nicaragua	-	-	-	-	-	-	-	-	-	-	-	-
Panama	-	-	-	-	-	-	-	-	-	-	-	-
Haiti	-	-	-	-	-	-	-	-	-	-	-	-
Dominican Rep.	-	-	-	-	-	-	-	-	-	-	-	-
French Guiana	-	-	-	-	-	-	-	-	-	-	-	-
Guyana	0.8	0.8	-	-	-	-	-	-	-	-	-	-
Suriname	73.0	85.0	-	-	-	-	-	-	0.4	1.0	8.0 c)	10.0 c)
Brazil b)	-	-	-	-	74.1	...	4,170.4	...	9.2	...	...	...
Bolivia	6.0	6.0	-	-	-	-	-	-	0.8	2.0	-	-
Colombia	546.7	700.0	69.7	50.0	-	-	-	-	14.8	20.0	11.4	20.0
Ecuador	1.2	1.0	-	-	-	-	-	-	0.7	0.5	-	-
Peru	16.2	30.0	-	-	-	-	-	-	-	-	-	-
Venezuela c)	0.4	...	...	...	...	...	...	...	...	...	...	...
Argentina	-	-	-	-	-	-	-	-	-	-	-	-
Paraguay	-	-	-	-	-	-	-	-	-	-	-	-
T O T A L	642.3	821.8	69.7	50.0	74.1	0.0	4,170.4	-	25.9	23.5	19.4	30.0

... No information available.

a) Estimated by countries. b) French Guiana also used 3,405 Tabs. of Halofantrin, 616 Tabs. Quinine 0.5 g. and Quinine 0.25 g. Also they used Halofantrine and Chloroquine syrup. c) Quinine 300 mg. d) Brazil also used 3,407,040 Tabs. of tetracyclin 250 mg. Artesunate IV. c) (VEN) Information up to September. d) (VEN) Includes Chloroquine ampoules.

III. MALARIA PREVENTION AND CONTROL PROGRAMS

Of the total number of cases of malaria diagnosed and reported during 1992 in the different areas of the Americas, the greatest proportion was registered in Brazil, with 51.4%, followed by the Andean Area, with 27.46%, and Central America, Panama, and Belize, with 14.56% (Table 9, Figure 2). However, the estimate of risk of becoming ill from malaria, that is the API, points to a different order, since the highest risk was in the Guianas, with an API of 38.5 per 1,000 population in the malarious area; followed by Brazil, with 9.5; Central America, Panama, and Belize, with 8.5; and the Andean Area, with 5.8 per 1,000 population exposed (Figure 3). Furthermore, the risk of dying from malaria is greater in the Caribbean area, (mainly Haiti), followed by the Guianas and Brazil, which are the countries with the highest percentage of *P. falciparum* infections (Table 6) (Figure 4).

The proportion of infections of *P. falciparum* has diminished in four of the seven countries of Central America, in Mexico and in Colombia. Yet the proportion of infections of *P. falciparum* has increased in Nicaragua, Ecuador, Bolivia, Peru, Venezuela, French Guiana, Guyana and Panama. In Brazil, Paraguay, Suriname, Haiti and the Dominican Republic, the proportion of infection by this parasitic species has remained stable vis-a-vis the previous year.

IV. SITUATIONS BY SUBREGION

Mexico, Central America, Belize, and Panama

This subregion, which includes Belize, Costa Rica, El Salvador, Guatemala, Honduras, Mexico, Nicaragua and Panama, has a population of 63,895,000 people in areas considered to be malarious, i.e. 22.0% of the total population of the malarious area of the Region of the Americas.

Of the 188,863 reported cases, 5,317 (2.8%) were diagnosed as *P. falciparum*; the remainder were caused by *P. vivax*, the predominant species in the subregion. On the other hand, in Belize one case was diagnosed as *P. malariae*.

With regard to the API, there is great variability among the countries. Mexico and Panama have an API of 0.37 and 0.31 cases per 1,000 inhabitants, while El Salvador presented an API of 0.93 per 1,000. Belize, Honduras and Guatemala presented the highest APIs in the subregion: 28.41, 18.05, and 14.54 per 1,000, respectively. In Costa Rica and Nicaragua the APIs registered were 7.93 and 6.50 per 1,000 inhabitants, respectively.

In Belize and Costa Rica, the situation deteriorated, with an increase in the API from 17.64 per 1,000 and 3.82 per 1,000 population in 1991 to 28.4 per 1,000 and 7.93 per 1,000 in 1992, respectively.

In Belize, the lack of resources restricts the scheduled activities designed to interrupt the transmission of malaria. From the time of its incorporation into the subregional project for malaria control in 1991, Belize has been in the process of refocusing its control program on clinical patient management. Despite efforts in this direction, however, the constant movement of the population over the course of the year made it difficult to achieve necessary coverage throughout the malarious area.

In Costa Rica, the epidemiological situation has suffered a major deterioration since 1990, owing mainly to a failure to observe social protection laws, particularly with respect to the short-term recruitment of banana industry workers. In addition, continuous deterioration is also a product of political and administrative difficulties in the management of the resources necessary for the treatment of clinical cases of malaria reported in the Atlantic region.

The Caribbean

This subregion is made up of 23 countries or territories¹. In 1991, there was a total population of 33,127,000, or 4.57% of the total population of the Hemisphere.

Most of this population lives in malaria-free areas. Of the four countries that reported, Grenada did not diagnose any cases of malaria during 1992, Jamaica reported six cases, Saint Lucia, one and Trinidad and Tobago ten cases. Most of these cases were classified as imported from other countries.

Cuba has maintained its system of monitoring travelers. In 1992, 430,031 slides were examined and 13 cases were diagnosed. Of these, 12 were imported and one was classified as introduced.

In Haiti and in Dominican Republic malarious transmission continues, with *P. falciparum* as the predominant parasite. The total population of Hispaniola accounts for 1.8% of the total in the Hemisphere, while *P. falciparum* infections account for 3.5% of those reported in the Americas.

Andean Subregion

This subregion includes Bolivia, Colombia, Ecuador, Peru, and Venezuela, with a population of 93,236,000 people, of which 56,432,000 live in potentially malarious areas. In 1992, the andean subregion as a whole reported 325,936 cases of malaria, of which 93,798 (28.8%) were diagnosed as *P. falciparum*. The reported parasite rate was 38.9% for *P. falciparum* in Ecuador, 37.6% in Colombia, 23.4% in Venezuela, and 11.3% in Bolivia.

¹ Anguilla, Antigua, Netherlands Antilles, Bahamas, Barbados, Cuba, Dominica, Grenada, Guadalupe, Haiti, Cayman Islands, Turks and Caicos Islands, U.S. Virgin Islands, British Virgin Islands, Jamaica, Martinique, Montserrat, Puerto Rico, Dominican Republic, St. Kitts and Nevis, Saint Vincent and the Grenadines, Saint Lucia, and Trinidad and Tobago.

Malaria in the Andean Region has traditionally been characterized by concentration of infections of *P. falciparum* in the area of the humid tropical jungle. However, a change is occurring in this serious form of infection in its movement toward the Pacific Coast, with high frequency of circulation of this parasitic species among the coastal population in Colombia and Ecuador. In Bolivia, transmission continues to increase in the jungle region along the borders with Brazil, and along the borders with Peru and Argentina. It is cause for concern that the increase in the transmission in Bolivia and Peru is due to infections by *P. falciparum*. In the plains region between Colombia and Venezuela, transmission persists due to an increase in migration between the populations of these two countries.

Amazon Subregion

This subregion includes the jungle transmission areas of Brazil, French Guiana, Guyana, and Suriname. It has a total population of 22,280,000 people, of whom 99.1% live in the Amazon region in Brazil. Transmission in this subregion is influenced by the opening of new frontiers for colonization and the chaotic economic development occasioned mainly by the mining of surface gold. The highest APIs in the entire Hemisphere are in this subregion: in French Guiana, with 35.4 per 1,000 inhabitants and 68.6% of the infections caused by *P. falciparum*; in Guyana, with an API of 52.5 per 1,000 inhabitants, with 60.1% of the *P. falciparum* infections; and in Suriname with an API of 4.6 per 1,000 inhabitants, 94.4% of the *P. falciparum* infections. In the Amazon region of Brazil there was a reported API of 27.3 per 1,000 inhabitants, with 43.2% of the infections caused by *P. falciparum*.

The Southern Cone Subregion

This subregion, made up of northern Argentina, Paraguay, and the border states of Brazil (São Paulo, Paraná, Sta. Catarina, Rio Grande do Sul, and Mato Grosso do Sul), had an API of 0.2 per 1,000 inhabitants, which accounted for 4,564 cases in a population of 33,456,000 people living in endemic areas. In Argentina and Paraguay, at the end of the year, 693 and 1,289 cases were reported respectively (with an API of 0.15 and 0.33 per 1,000 inhabitants).

Sep/7/93

Table 9

MALARIA CASES REGISTERED IN THE REGION OF THE AMERICAS, 1989-1992

Countries (by geographical sub-regions)		Population 1992 a) malarious areas	1989		1990		1991		1992	
			Registered cases	%	Registered cases	%	Registered cases	%	Registered cases	%
Countries without transmission and where eradication of Malaria has been certified		83,289 b)	2,032 b)	0.18	1,739 b)	0.14	1,144 b)	0.09	1,263 b)	0.11
MEXICO	Mexico	43,578	101,241	9.09	44,513	3.62	26,565	2.16	16,170	1.36
CAPB	Belize	188	3,285		3,033		3,317		5,341	
	Costa Rica	877	699		1,151		3,273		6,951 c)	
	El Salvador	4,866	9,605		9,269		5,933		4,539	
	Guatemala	3,959	42,453		41,711		57,829		57,560	
	Honduras	3,924	45,922		53,095		73,352		70,838	
	Nicaragua	4,131	45,982		35,785		27,653		26,866	
	Panama	2,372	427		381		1,115		727	
	Sub-total	20,317	148,373	13.32	144,425	11.74	172,472	14.01	172,822	14.56
CARIBE	Haiti	5,360	23,231		4,806		25,511 b)		13,457 d)	
	Dominican Rep.	7,371	1,275		356		377		698	
	Sub-total	12,731	24,506	2.20	5,162	0.42	25,888	2.10	14,155	1.19
GUIANAS	French Guiana	115	6,284		5,909		3,573 b)		4,072	
	Guyana	756	20,822		22,681 b)		42,204 b)		39,702	
	Suriname	302	1,704		1,608		1,490		1,404	
	Sub-total	1,173	28,810	2.59	30,198	2.45	47,267	3.84	45,178	3.81
BRAZIL	Brazil	64,208	577,520	51.85	560,396	45.54	614,431 b)	49.93	609,860 b)	51.36
ANDEAN AREA	Bolivia	2,758	25,367		19,680		19,031		24,486	
	Colombia	23,758	100,286		99,489		184,156		184,023	
	Ecuador	5,891	23,274		71,670		59,400		41,089	
	Peru	7,704	32,114		28,882 e)		33,705 f)		54,922 c)	
	Venezuela	16,321	43,374		35,082 c)		42,826		21,416 b)	
	Sub-total	56,432	224,415	20.15	254,803	20.70	339,118	27.56	325,936	27.45
SOUTHERN CONE	Argentina	4,204	1,620		1,660		803		643	
	Paraguay	3,888	5,247		2,912		2,983		1,289	
	Sub-total	8,092	6,867	0.62	4,572	0.37	3,786	0.31	1,932	0.16
TOTAL		289,820	1,113,764	100.00	1,045,808	100.00	1,230,671	100.00	1,187,316	100.00

a) Population in thousands. b) Provisional e incomplete information. c) Information up to September.
d) (HAI) Information up to June. e) (PER) Information up to October. f) (PER) Information up to November.

Figure 2

PERCENTAGE OF MALARIA CASES, AMERICAN REGION, 1992

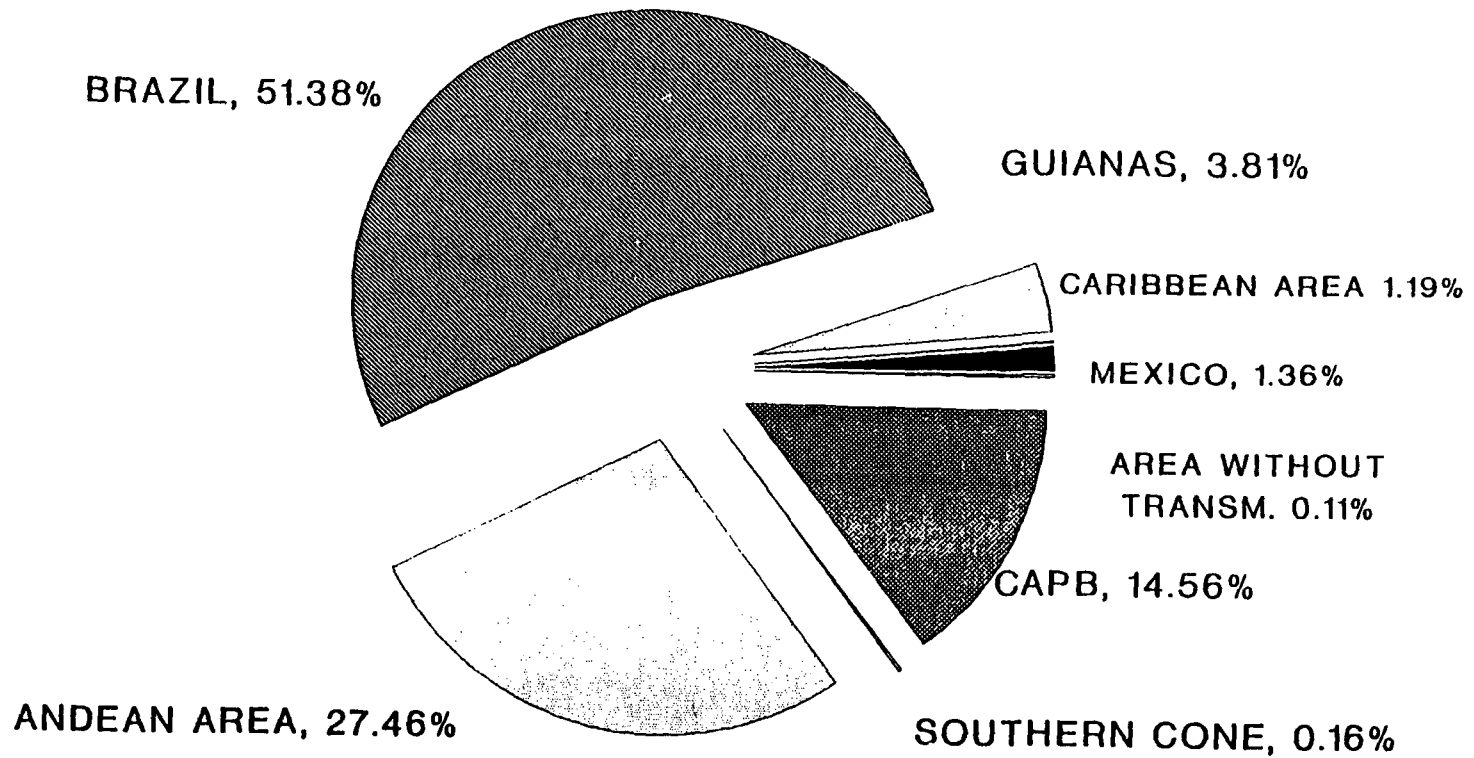
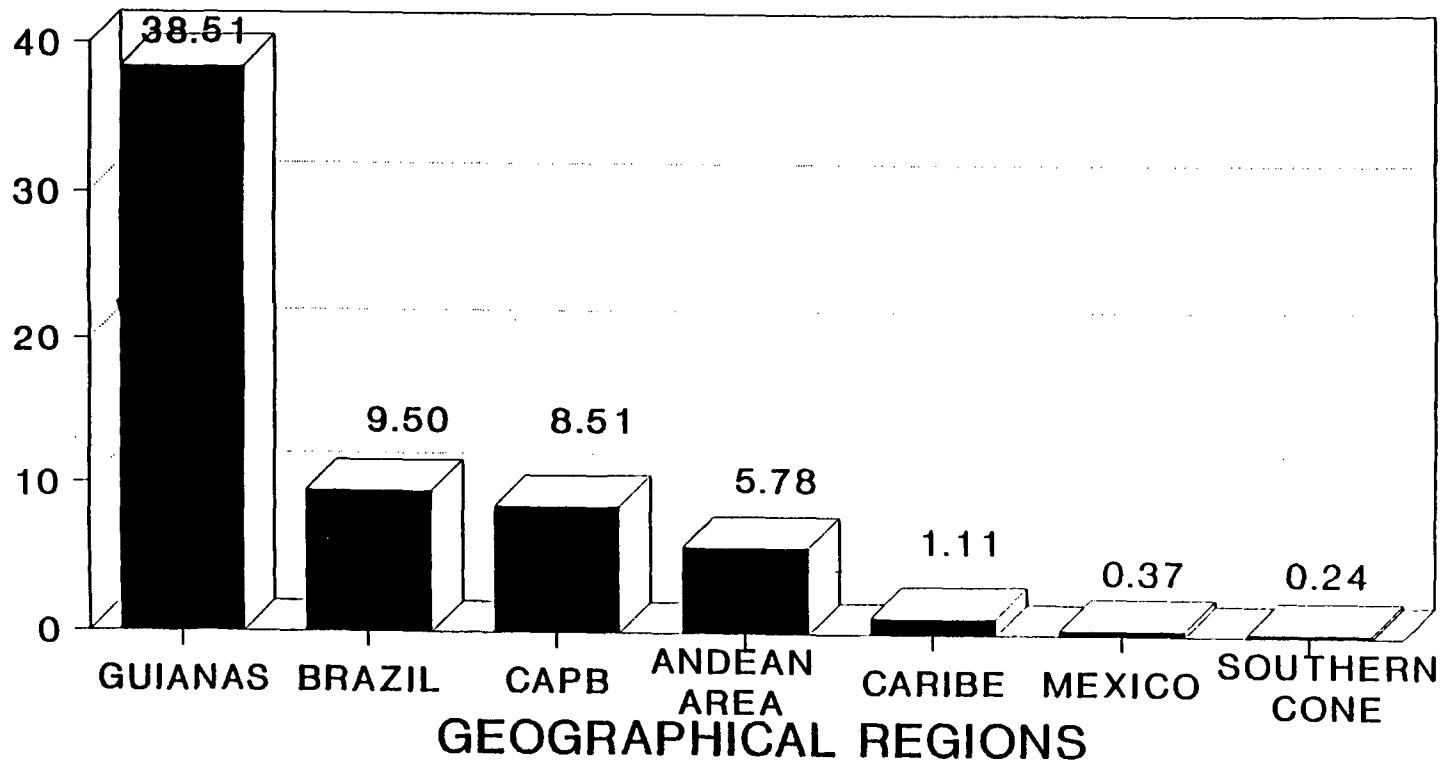


Figure 3

ANNUAL PARASITE INDEX, (API) 1992 *

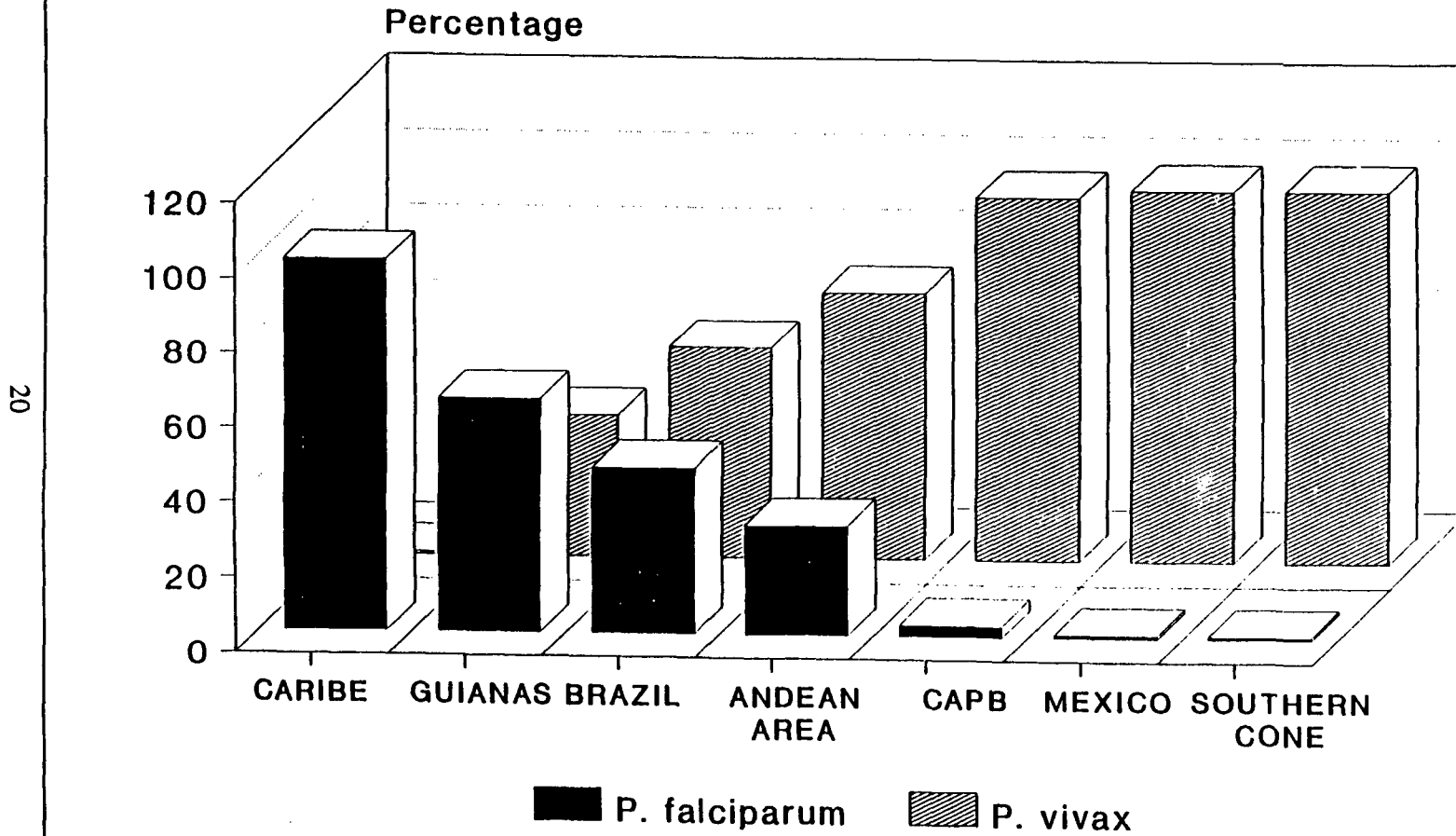


■ API, BY 1000 INHAB.

* API, Pop. malarious areas

Figure 4

PARASITE SPECIE DISTRIBUTION * SUB-REGIONS OF THE AMERICAS, 1992



* Percentage

V. STATUS OF CONTROL PROGRAMS

The malaria prevention and control programs in the Americas, identified the obstacles to the success of the epidemiological impact of their actions (Table 10). Possible solutions were then considered and discussed at the Inter-regional Meeting on Malaria, held in the Americas Brasilia, on 26-30 April 1992. The following four ecological categories for the transmission of malaria were established:

1. Malaria in the coastal areas
2. Malaria in interior lowlands
 - 2.1 Savanna malaria
 - 2.2 Jungle malaria
3. Malaria in pre-mountainous areas
4. Malaria in high mountain valleys

These basic topographical characteristics should set the stage for the malaria prevention and control program to develop a process of epidemiological stratification and incorporation into local health services.

However, the importance of these ecological factors depends on the interaction of micro-epidemiological factors relating to social development and the processes of natural resource development.

Critical Analysis

Considering that the presence of malaria in the Americas is a phenomenon with local characteristics, the prevention and control of the disease should be based on adequate knowledge of the variable environmental, entomological, industrial, agricultural, social, meteorological and other processes conducive to transmission in a given area. To that end, it is necessary to strengthen and expand the information systems for collecting baseline epidemiological data and data for subsequent surveillance and forecasting; and it is no less important to make the best possible use of the pertinent information obtained from the sectors outside the health area, in addition to that obtained from the health services, through organized mechanisms of intersectoral coordination.

It is important that the epidemiological information systems take into account changes in the social and economic factors contributing to malaria, as a part of the necessary basis for the stratification of malarious areas and for the identification of the population groups particularly susceptible to exposure and of the determination of feasibility in the utilization of appropriate measures of intervention.

Considering that the vector control measures and the reduction of contact between man and vector constitute one of the basic ways to prevent the transmission of malaria, we should recognize that the measures used in the present decade have been inappropriate for the different types of transmission currently in the Americas. This is due in part to the lack of adaptation of available scientific knowledge, to the change in the utilization of vector control measures.

Malaria prevention measures require community participation in a common effort to identify, quantify, and prevent or neutralize social and environmental factors relating to transmission, that is, to contribute to malaria epidemiology in the fullest sense of the term and to the application of its results. A lot of these factors are already known generally; however, most of the known facts are based on the use of a biomedical model, centered on the interactions between the vector, the parasite and the human host. This is essential knowledge, fundamental for any attempt at combating malaria. But as a whole it paints an incomplete picture from the epidemiological standpoint, giving only secondary attention to the social causes without considering the social and qualitative impacts of malaria on the individual, the family, and the community.

In addition, malaria has important economic effects at the community, family, and individual levels; and it is a cause for political concern that malaria continues to be present in some social groups in the Latin American countries. This does not mean, however, that there should be a perpetuation of those concepts and methods of organization geared toward eradication. The correct path is, rather, to strengthen local health services so that they may prevent and combat malaria, provide necessary diagnosis and treatment services, and carry out environmental interventions in high-risk situations. It is necessary to plan health services together with careful planning of new human settlements and to provide the information and the necessary means for the individual protection and the management of the environment, both at home and in the workplace.

Better knowledge of the dynamics of the distribution of malaria under various economic and social conditions would be very useful in the local planning of control measures. This is a sector in which epidemiological research is necessary, especially with regard to the interaction between the environment and human ecology. In addition, resources for operational area applied research should be assigned to the malaria, prevention and control programs. The scientific community, the governments, and the society in general should participate in the task of translating results into action.

Recommendations of the Interagency Meeting for the Americas

Traditionally, the eradication of malaria programs have always had a very centralized system of management. This situation still persists today in many, if not all of the countries in which the malaria campaign continues to be a priority. These programs should be integrated into the other structures of the health services, in order to create a functional system for the diagnosis and early treatment of malaria. However, certain vested interests may be opposed to decentralization and integration. It will be necessary to distinguish between legitimate concern

in light of technical and operational difficulties faced by health services in the management of their malaria problem and the desire of some people to utilize the local difficulties as an excuse to maintain the *status quo*.

This does not mean that there should be a sudden transfer of the decision-making power, responsibility, and obligations, for malaria control to services that were not formed and are not well equipped to handle this task. It should be a gradual process, in which the local health services assume new responsibility for the clinical management of malaria as the integration of the services strengthens their potential and resources. Emphasize should be placed on creating a planned and lasting capacity; the modalities will vary according to the circumstances and structures of each country. But the responsibility of the State is the same for a new decentralized and more efficient program.

Current status of integration into local services

Some of the facts mentioned above are more clearly set forth in Table 11, in which the countries of America with programs of malaria prevention and control report on specific epidemiological surveillance of malaria.

This table indicates that of 8,943,263 slides examined, 3,326,983, that is approximately 37% were collected by "active case detection." However, only 11.3% positive slides were collected by this mode. The low efficiency of this mode of detection is due, among other reasons, to poor selection of the population to be sampled. Clearly, the taking and examination of 3,326,983 slides through active case-finding, resulting in a 4.0% rate of positivity, confirms this impression.

In addition, Table 11 also shows that requests for treatment received by volunteer "any collaborators" from persons with fever, indicate other important characteristics for the health care services:

- a. the efficiency in precision of coverage of the exposed population is more than 3 times greater than is the efficiency of active case detection (14% positivity);
- b. the demand for diagnostic services presented by these "persons with fever" has been satisfied in only 14% of the cases treated (359,925 diagnosed as positive);
- c. for the 2,196,238 "persons with fever" in whom malaria was not confirmed, the general health services have missed the opportunity to diagnose their ailment, because there is still no referral system between the "voluntary collaborators" and the general health services.

Table 10

AREAS WITH TECHNICAL AND ADMINISTRATIVE PROBLEMS IN THE CONTROL OF MALARIA
IN THE AMERICAN REGION, 1992

Countries and areas (by geographical region)	Population of affected areas	Area km ²	Insecticide		Number of cases	Principal vectors	Causes of the problem
			Type used	years of coverage			
Mexico:							
Chiapas	2,989,017	72,002	DDT a)	35	3,895	A. pseudopunct. y	Insufficient intradomiciliary sprayings, Intense migratory movements, including from Centroamerican countries, inopportune and late case detection, extradomiciliary transmission.
Guerrero	2,668,405	62,718	Mal a)	3	639	A. albimanus	
Michoacan	2,652,533	57,309	Abate y	3	1,197	"	
Oaxaca	2,866,188	87,922	Baytex a)	3	2,807	"	
Sinaloa	2,274,889	58,092	.	.	2,748	"	
Total Mexico	13,451,032	338,043			11,286		
Belize							
Cayo District, Toledo	44,954	...	DDT	...	5,341	A. albimanus	Population movements; high rainfall, deforestation.
Costa Rica:							
Limon Province	243,947	9,188	Malathion	2 years	5,210	A. albimanus	Anophelinic density due to ecological changes; population movements; operational & administrative difficulties
El Salvador:							
Pacific coast (Hyperendemic area)	970,162	4,819	Bendio- carb	12	3,682	A. albimanus	Humidity, temperature changes, rain, Pop. movements; poor residual power of the insecticide's spraying
Guatemala:							
Regions I to VIII	3,498,210	160,300	Delt. Prop. Bendioc.	2 & 3 1 & 2 1	57,559	A. albimanus	Topographic conditions, migrations; ecological changes; vector resistance to insecticides, financial problems.
Honduras:							
Region II	511,266	...	Fenitrothion	5	58,087	A. albimanus	Difficult access to affected areas; poor coverage; unknown space/population of the local Health Services
III	1,360,804						
IV	520,161						
Nicaragua:							
Chinandega, Jinotega, RAAS, RAAN, Rio San Juan	772,633	...	Fenitrot. Deltametrin	...	15,159	A. albimanus	Unknown space/population of the local Health Services; poor coverage new population settlements
Panama:							
Pinogana, Chepigana, Chepo, San Blas, Changui- nola, Cemaco, Sambú, Bocas del Toro, Chiriqui Grande	213,453	...	Fenit.	....	545	A. darlingi A. albimanus	Difficult access to affected areas; indigenous population movements between Colombia-Panama-Colombia

... Information not available.

a) The 5 States have used these insecticides.

Table 10 (Pag. 2)

 AREAS WITH TECHNICAL AND ADMINISTRATIVE PROBLEMS IN THE CONTROL OF MALARIA
 IN THE AMERICAN REGION, 1992

Countries and areas (by geographical region)	Population of affected areas	Area km ²	Insecticide		Number of cases	Principal vectors	Causes of the problem
			Type used	years of coverage			
Haiti:	...	...	..	...	13,457	A. albimanus	Environmental deterioration; social problems in rural areas; poor health services coverage; increase of the rural migrations
Dominican Republic La Altagracia, Monte Cristi, National District, Valverde	103,423	...	DDT	...	124	A. albimanus	Migrations; seasonal population movements.
French Guiana * Maroni, Oyapock, Littoral et Arriera-Pays	119,176	...	Deltam.	...	...	A. darlingi A. aquasalis A. brasiliensis A. Nuñeztovari	Population movements, poor housing, difficult access to affected areas Problems in the anti-vector campaign migration of mining workers.
Guyana * Regiones 1, 2, 7, 8 y 9	99,433	59,529	DDT	Mas de 20	31,312	A. darlingi A. aquasalis	Poor housing, continuous population movements; timber and metal desorganized exploitation
Brazil * Acre, Amapá, Amazonas, Maranhao, Mato Grosso, Para, Rondonia, Roraima	22,088,000	...	DDT	...	566,022	A. darlingi A. albitarsis A. nuñeztovari	Intense population movements; new settlements; poor housing; "garimpos"; P. falciparum resistance; high anophelinic density in the Amazon region; administrative and human resources problems.
Bolivia: Riberalta y Guayamerin Cachuela Esperanza Depto. Pando, Nueva Esper	75,600 1,895	22,434 13,200	DDT DDT	32 10	8,278 1,348	A. pseudopunct. "	Poor housing; difficult access to affected areas, parasite and vector resistance; permanent breeding places; migrations and mining exploitation
Colombia: * Bajo Cauca Pacífico Orinoquia Amazonia a) Uraba	448,902 906,746 546,488 465,816 489,699	30,000 80,000 90063 110,900 20,000	DDT DDT, Fen. DDT DDT DDT, Fen.	23 22 y 3 23 23 23 & 3	67,640 44,491 21,410 17,593 18,418	A. albimanus A. darlingi A. nuñeztovari A. punctimaculata A. evansae A. pseudopunct.	Poor spraying coverage; social problems; vector behavior, lack of financial resources; technical and social problems.

... No information available * Countries with areas in the Amazon region

a) These vectors are in all listed areas.

Table 10 (Pag. 3)

AREAS WITH TECHNICAL AND ADMINISTRATIVE PROBLEMS IN THE CONTROL OF MALARIA
IN THE AMERICAN REGION, 1992

Countries and areas (by geographical region)	Population of affected areas	Area km ²	Insecticide		Number of cases	Principal vectors	Causes of the problem
			Type used	years of coverage			
Ecuador: *							
Manabí	548,254	14,597	DDT	> 20	8,021	A. punctimacula	Seasonal migration by laborers; poor living conditions in the outskirts of the cities.
Esmeraldas	378,078	9,572	Malathion		11,107	A. albimanus	
Sucumbios	72,718	12,503			1,991	A. pseudopunctip. A. rangali	
Paru: *							
Coastal and forest regions; Andean valleys	1,252,453	...	DDT	...	...	A. pseudopunct.	Seasonal migrations, socio-politic factors
Suriname: *							
River basins of the Marowyi Suriname, Soromaca & Alto Corentiju Rivers.	28,555	108,000	Deltam.	...	1,404	A. nuñeztovari	Incomplete figures due to information breakdown; political unrest
Venezuela: *							
Occidental area	553,383	19,395	DDT	45	...	A. nuneztovari a)	Vector exophily, population movements; lack of integration with the local health services.
Meridional area	149,373	120,208	Fenit.	7		A. darlingi a)	
Argentina							
Tartagal, Oran	108,320	11,275	DDT K'otrin	45	293	A. pseudopunct.	Intense internal and external migration, limited access to affected areas due to climatological conditions, financial problems; bordering with malarious areas
Paraguay:							
Caaguazu, Alto Parana	911,591	26,369	DDT	34 y 35	1,149	A. darlingi	Active residual foci among indigenous population, new rural settlements
Amambay and Canindeyu	235,005	27,600	DDT	Roc. foca	83	A. darlingi	
Total	1,146,596	53,969	-	-	1,232	-	
Sub-total	2,507,369	65,244	-	-	1,525	-	-

... No information available * Countries with areas in the Amazon region
a) Both vectors in all the malarious areas.

Table 11
COMPARATIVE RESULTS OF PASSIVE AND ACTIVE CASE DETECTION
UNDER MALARIA PROGRAMS IN THE AMERICAS, 1992

Countries by geographical sub-regions)	PASSIVE CASE DETECTION General Health Services and hospitals				VOLUNTARY COLLABORATORS				ACTIVE CASE DETECTION Evaluators, Epid. Investigations & follow-ups			
	Number of Inform. posts	Blood Slides Examined	Posi- tives	%	Number of Voluntary Collab.	Blood Slides Examined	Posi- tives	%	No. of Evalua- tors	Blood slides examined	Posi- tives	%
Mexico	12,683	508,209	5,512	1.08	40,535	264,169	8,169	3.09	898	896,351	2,489	0.28
Belize	48	-	-	-	334	15,423	3,251	21.08	12	8,712	2,090	23.99
Costa Rica a)	51	-	1,858	-	258	3,081	570	18.50	110	100,581	4,523	4.50
El Salvador	249	10,077	173	1.72	2,563	122,152	4,022	3.29	94	70,217	344	0.49
Guatemala	122	19,808	2,878	14.53	1,712	372,401	64,106	14.53	100	3,982	576	14.54
Honduras b)	662	80,765	13,094	16.21	5,924	366,083	56,114	15.33	...	25,102	1,630	6.49
Nicaragua	513	134,745	9,241	6.86	2,411	210,706	16,604	7.88	125	36,264	1,021	2.82
Panama	176	140,854	223	0.16	4	142	17	11.97	278	167,363	487	0.29
Sub-total	1,821	386,249	27,467	7.11	13,204	1,089,988	134,684	12.36	719	412,201	10,671	2.59
Haiti c)	...	37,957	13,457	35.45	...	...	...	...	...	...	...	...
Dominican Rep.	4,432	16,912	176	1.04	25,621	32,240	102	0.32	167	250,397	420	0.17
Sub-total	4,432	54,869	13,633	36.49	25,621	32,240	102	0.32	167	250,397	420	0.17
French Guiana	20	-	-	-	...	31,215	3,548	11.36	...	26,710	526	2.05
Guyana	...	118,441	35,202	29.72	...	40,667	4,500	11.07	...	-	-	-
Suriname	108	13,793	1,404	10.18	-	-	-	-	45	6	0	0.00
Sub-total	128	132,234	36,606	27.68	0	71,882	8,046	11.19	45	25,716	526	2.05
Brazil d)	3,673	1,093,359	376,190	34.41	15,144	747,040	143,007	19.14	4,251	1,114,797	90,683	8.13
Bolivia	265	30,911	12,037	38.94	2,853	19,512	6,493	33.28	62	74,991	5,958	7.94
Colombia	1,538	475,298	125,431	26.39	1,569	165,066	48,409	29.33	...	96,134	10,183	10.59
Ecuador	497	155,428	24,490	15.76	2,497	109,942	10,161	9.24	110	111,953	6,438	5.75
Peru e)	...	123,147	54,922	...	...	...	...	...	...	...	...	...
Venezuela	682	91,574	15,462	16.88	-	-	-	-	1,210	244,997	5,954	2.43
Sub-total	2,982	876,356	232,342	26.51	6,919	294,520	65,063	22.09	1,382	528,075	28,531	5.40
Argentina	20	3,571	301	8.43	3	103	41	39.81	70	9,945	301	3.03
Paraguay	171	3,801	260	6.84	1,711	56,221	813	1.45	...	89,501	216	0.24
Sub-total	191	7,372	561	7.61	1,714	56,324	854	1.52	70	99,446	517	0.52
TOTAL	25,910	3,058,648	692,311	22.63	103,137	2,556,163	359,925	14.08	7,532	3,326,983	133,817	4.02

... Information not available

a) (COR) Information up to September. b) (HON) Information by source not available. c) (HAI) Information up to June.
d) (BRA) Provisional information. e) (PER) Number of positives up to September, without information by source.
f) (VEN) Provisional information.

Aug/30/93

VI. GLOBAL MALARIA CONTROL STRATEGY

As a result of the epidemiological analysis of the social and economic impact of malaria in the world, the Member Governments of PAHO/WHO have decided to revise the concepts, principles, and strategies for the malaria control. For that purpose, representatives of technical and political sector of 142 countries met in Amsterdam from 26 to 27 October 1992, in order to establish a new approach to the solution of the malaria problem.

The new strategy is the collective expression of the recommendations of 82 malarious countries throughout the world, which assessed the successes and weaknesses of the malaria activities and proposed solutions in three international meetings recently organized by the World Health Organization, in Africa, the Americas and Asia. The conferences were attended by the health officers responsible for the malaria control programs in those countries, by representatives from donor agencies, research institutions, UNICEF, UNDP, and the World Bank. The strategy thus represents a worldwide consensus.

Inasmuch as the malaria situation varies from country to country and within each country, as well as among regions and localities, it is no longer possible to think about a single control measure for all the situations in which malaria is transmitted. On the contrary, the circumstances of each country will influence the organization of its resources and programs for health care with a view to applying them according to the identification of the problems and priorities to be dealt with at the local level.

The objective of the antimalarial strategy is to prevent mortality and reduce morbidity and social and economic losses, through the progressive improvement and strengthening of local and national capabilities for health protection.

The four basic technical elements of the strategy are:

- to provide early diagnosis and prompt and effective treatment;
- to plan and implement selective and sustainable preventive measures;
- to detect early, contain, or prevent epidemics; and
- to reassess regularly the malaria situation in each country, including the ecological, social, and economic determinants of the disease.

For effective implementation of this global strategy, it is necessary that:

- there be sustained political commitment at all levels of government and in the private sector;

- control and prevention of malaria be an integral part of health systems, and that it be coordinated with relevant development programs in non-health sectors;
- communities be full partners in malaria prevention and control activities; and
- adequate human and financial resources be mobilized.

For the countries of the Americas it will be necessary to better channel the disease prevention and control activities toward effective and real protection of the exposed population. The earlier discussion on the indiscriminate use of drugs and the low efficiency of the slide sampling system for the parasitoscopic diagnosis of malaria reflects this need for better focusing of the resources used for malaria control.

Moreover, the lack of integration between the activities of the national control programs and the local health services has given rise to a high demand for care that has yet to be met. This demand could be met through a referral and counter-referral system among the volunteer aides, the program evaluators, and the health care services, as a first step to bolstering the capacity of the local health systems.

VII. MALARIA PREVENTION AND CONTROL ACTIVITIES, UNDER THE NEW GLOBAL STRATEGY

Clinical management of the disease

Provisions for early diagnosis and prompt and effective treatment -disease management- is the fundamental element of malaria control. It is a basic right of the affected populations, and needs to be made available wherever malaria occurs. Populations at special risk of malaria must be identified and specifically defined so as to focus the diagnosis and treatment facilities to ensure prompt management of the disease among them. Especially important categories are children and pregnant women, non-immune groups of migrants/settlers and non-immune indigenous groups who have recently come into contact with the general population.

All the countries should have and review their national policies on antimalarial drugs. Those policies should take into consideration epidemiological factors that affect treatment objectives, such as the geographical distribution of the parasite and its degree of resistance to the drugs, the characteristics of the health services, including private sector, levels of services for treatment with different drugs, and the risks and benefits of the drug regimens, compliance with them, and their cost. It is impossible to offer a universal formula for the clinical management of malaria that could be applied in all countries of the world.

As a general principle, the health ministries should pursue a policy of diagnosis and treatment that prevents mortality and reduces morbidity and the development of drug resistance.

The health ministries should also ensure that all health care providers, whether public or private, are fully knowledgeable of the official drug policies and their rationale, and where variations in ministry policies are introduced, they should be consistent with that rationale.

The difficulty of diagnosing the parasitic species of each infection with certainty, if blood slides cannot be promptly examined by a skilled microscopist, makes it necessary to develop practical guidelines for the management of patients with fever by personnel at different levels of health care. Such guidelines should specify the criteria for the use of particular drugs, standardized treatment regimens, measures of general supportive care, criteria for referral, and conditions for follow-up. Such guidelines will also determine which antimalarial drugs are needed, the quantities required, and their distribution to the local health system.

Referral services should be able to diagnose malaria microscopically, preferably at the second level of care. This is needed in order to identify the species involved, to confirm a clinical diagnosis in the case of serious and complicated malaria, and for dealing with treatment failure at the first level of care. This will help to minimize the patient's exposure to drugs that may have adverse effects and to target expensive drugs to the patients who most need them. In addition, referral to the second level of care will increase the demand for treatment caused by other conditions, thereby requiring greater capacity from the local health system.

It is a governmental responsibility to ensure the quality of the drugs needed for treatment, and their availability and affordability. This can be facilitated through the procurement and distribution of generic drugs. Decisions on registering and introducing new drugs should be based on a well-documented need for them.

The ever-increasing resistance of malaria parasites to drugs is a matter of great concern. Treatment failures must, therefore, be monitored and investigated to determine the frequency, degree, and distribution of drug resistance. Such information serves for periodic review of antimalarial drugs and treatment policies and their modification, as appropriate. The methods and approaches used for monitoring drug susceptibility should be as simple as possible, to ensure the widespread collection of the information required.

In general, malaria control services should be converted into trainers and pioneers in order to ensure the quality of disease management within the general health services, as well as the correct use of the services by the affected population. They should provide the community with information on the risks of malaria, its prevention, and action to be taken when infection occurs. Official and unofficial drug providers should be furnished with understandable information on the use of antimalarial drugs and the importance of ensuring that patients take the full curative dose and seek immediate competent care at the second level in the event of continued illness.

Disease prevention

Prevention of malarial disease encompasses a variety of measures which may protect against the infection or against the development of the disease in infected individuals. Measures that protect against the infection are designed to reduce the contact of man with vector mosquitoes and may be classified as: personal protection aiming at protecting individuals or households against infective bites, or transmission control aiming at reducing the risk of malaria to entire communities or populations. Measures for protecting against disease without preventing infection include immunization (still in the experimental phase) and, exceptionally, chemoprophylaxis. It must be emphasized that the efficacy of all preventive measures should be evaluated in terms of the incidence of malarial disease and its effects.

Personal protection

A degree of individual and collective protection can be obtained by a variety of means: protective clothing, repellents, screening of houses, bed-nets and hammocks impregnated with insecticide, proper site selection for dwellings, adjustment of activities according to the vector's biting cycle, identification and elimination of nearby breeding sites, and improvement of social conditions in the housing of temporary or permanent workers.

Immunization and chemoprophylaxis

In the future it may be possible to use immunization against malaria as one of the preventive measures. Although some vaccines have already been tested in the field, they are still in a phase of industrial development. Even when available for utilization, there are no plans to use them as the solution to the malaria problem, but as a component of strategies that include other social protection measures.

The difficulty of ensuring that people strictly follow the prophylactic drug regimens of antimalarials and the increase in drug resistance have reduced recourse to the use of drugs for chemoprophylaxis and to the mass distribution of drugs. As a control measure, chemoprophylaxis is no longer recommended for children or other large groups, except for temporary use in special circumstances. Chemoprophylaxis remains desirable for pregnant women in areas of high transmission, but it is necessary to weigh the toxic risks, costs, and benefits of the available drugs in each local situation. Studies on the combination of personal protection and medication should be encouraged among special groups that work and live in strictly controlled situations.

Vector control

The measures available for control of transmission of the malaria parasite include chemical insecticides, biological agents and environmental management. Of these, reliance has been so far placed mainly on spraying with residual insecticides. In the right circumstances, this was very effective until the first half of the 1970s. The achievements made at that time were

maintained with the social and economic development of broad sectors of the countries of the Americas. However, the current distribution of the characteristics that affect malaria transmission is very different from the distribution that existed when the spraying of houses was effective. In addition, the proper use of insecticides is a complex matter, involving considerable expenses and trained personnel as well as continuous application, usually for many years.

A necessary first decision to be made, therefore, is whether to continue with (or embark upon) large-scale vector control. It should be considered in areas where it will be cost-effective, and where environmental and social conditions, as well as the development of services for disease management, will allow the gains to be maintained. This implies careful analysis of the epidemiological situation, prior results, the human resources and the funds that may be allocated or reallocated for the work, and the sustainability of the operations over an undetermined period of time.

Malarious areas should be carefully delineated in order to identify the situations in which there is a need to start with vector control and to select appropriate methods. The available methods differ widely in the nature, extent, and duration of their efficacy and in their appropriateness to the local malaria situations, i.e., in their site-specificity. Selectivity is essential, both in deciding whether and where to attempt vector control and, if the decision is to do so, in determining the particular method or methods to use.

The selection must be based on adequate knowledge about the vectors concerned and the relevant environmental, ecological, social, economic, and health services development features. Expertise in all these areas should be drawn upon when preparing national guidelines for decision-making about the use of vector control methods.

In some countries, the extent and cost of spraying operations (Tables 12 and 13) have been reduced without an increase in malaria infection by a gradual shift to well-targeted spraying of priority areas identified through effective information systems, which are sensitive to the seasonal movements of the population as well as to permanent migratory movements.

Environmental management can reduce or eliminate mosquito breeding sites. It is a complex series of measures which should be more often applied by the local community for collective protection from vectors, as well as being incorporated into project planning and infrastructure development activities. Incorporation into development activities requires intersectoral collaboration between the health sector and of those involved in development, agriculture, water, and other relevant activities. At the same time budgetary provision needs to be made for the necessary action required for these development activities, including the maintenance of environmental management projects for vector control. National and international bodies supporting development activities should be, and often are, aware of the need for careful environmental planning and management to protect health.

Prevention and control of epidemics

Malaria epidemics occur when populations with little immunity are exposed to a high intensity of transmission, due to from various causes. In the Americas, the valleys or the jungles and the coastal areas are particularly likely to experience epidemics, especially when affected by ecological disturbances caused by man. Epidemics also occur in areas of social, economic, and political instability, where basic services have disintegrated or are nonexistent. Most malaria control programs with centralized structures are not designed in order to detect or react quickly to emergencies. Often, an aberrant situation is reported first by peripheral authorities outside the health sector. There is an urgent need to strengthen the capacity for early detection of epidemics and to speed up the communication between the peripheral health services and the second level of care. Ignorance and lack of interaction between program staff and the peripheral health services in areas where these conditions exist can exacerbate the frequency of epidemics.

Areas prone to epidemics can be identified by epidemiological stratification that takes account of vectorial transmission capacity, environmental (including meteorological) conditions, social and economic conditions, migratory patterns and centers of population movements, as well as other factors known at the local level. Local health services have much to contribute to this process, and it is they who should first report a suspicious increase in the number of patients with fever. On the basis of this stratification, a limited set of indicators of epidemic potential or risk factors can be prepared that can be monitored by local health personnel and used to build up community preparedness and prevention.

Contingency plans should also be worked out according to the most probable situations, and any resources that could be rapidly mobilized should be identified. Emergency relief organizations should include malaria in their planning so that, in collaboration with the regular services, they can deal with epidemics occasioned by natural disasters or other urgent situations that involve sudden, large population movements.

The epidemiological basis of the malaria control

Assessment and analysis of local malaria problems are a prerequisite for embarking on any control activity. An appropriate epidemiological information system is therefore an essential part of a control program. Epidemiological information should include not only morbidity and mortality data, but also the underlying factors relating to the human population, the parasite, the vector, and the ecosystem, as well as the impact of malaria on the local social group.

The status of health services and that of existing vector control activities are also important determinants to be taken into account in planning. Such planning must also consider the constraints and opportunities posed by resources and the physical and administrative infrastructure, available at every level of social organization.

Major epidemiological types

In each local situation an examination of epidemiological and operational aspects of the problem is required. This has been the basis of stratification as traditionally applied to determine appropriate control approaches in different areas of many countries. Practical experience accumulated over many years has shown that this process can be simplified. On the basis of easily recognizable ecological and social characteristics, most malaria situations in the world can be identified as falling within a few major epidemiological types. For each of these, certain risks are particularly important, and certain approaches to control are more likely to succeed than others. Planning of malaria control for a given area should therefore start with identification of the epidemiological types within it. This should be followed by collection of the information relevant to the particular risks and to the control approaches which might be realistic and effective for each local situation.

Epidemiological information systems

The need for effective information systems for control programs is widely recognized, but their effectiveness has been hampered by the lack of timeliness or relevance of the data collected, as well as by communication problems. Such systems should be decentralized. An alert person in the community or at the district level is often in a better position to detect an abnormality and understand its causes than people working on the basis of quantitative criteria at the central level. It is therefore of great importance that personnel in the periphery are trained in analysis of epidemiological data, provided with the necessary technical resources, and adequately supported by the central level.

Epidemiological information systems are essential in all malaria control programs. Their objective is the regular reassessment of the malaria situation in the focus of transmission, including the ecological, social and economic determinants of the disease. This will allow the forecasting or detection of epidemics, definition of risk groups, and identification of problems in program implementation that require intervention. The training of local personnel in the management and analysis of these variables is fundamental to control of the disease.

Data are required to give information on morbidity, mortality, drug consumption, efficacy of treatments, as well as quality and coverage of health service activities. Surveillance and compilation of this data should be focused on malarial disease, and particular attention should be given to complicated disease and failures of standardized treatment. Programs including or contemplating vector control need to collect and use entomological data; in most cases, this should be done by operational research. It is necessary for programs to be alert to the social and ecological (including meteorological) changes which could cause or influence malaria problems.

In addition to the training of personnel at the local level, the main role of central program staff should be to analyze the broader trends and provide health service staff and sectors outside health with the information that will help them in their local programming. For many countries

facing similar problems, continuous international exchange of information on malaria and risk factors could play a greater role than is presently the case.

Operational research

All malaria control programs require a capability for operational research so that program activities can be made more effective and wastage avoided by adaptation to varying situations and changing biological and epidemiological factors. Such research should be relevant to national control objectives, addressing not only the efficacy of specific interventions, but also social, economic, cultural, and behavioral factors that might affect program activities and outcomes. Such factors can either increase or decrease the possibility of communities assuming greater responsibility for their own protection.

National control staff often need research training. The dissemination of research results to areas which might have use of them needs to be enhanced. National programs and research institutes should collaborate more closely to increase the relevance of research on control, in order to improve the quality of operational research and to ensure the usefulness of research results in practice. In this connection, international communication is of great importance for exchange of ideas and for making use of results obtained in related situations.

In the Region of the Americas, there has been a gradual increase in the funds allocated for specific malaria research (Table 14).

Table 12
 SPRAYINGS WITH RESIDUAL INSECTICIDES APPLIED IN 1991 and 1992

Countries	Hydrochlorides		Organophosphates				Carbamates				Pyrethroids	
	DDT		Malathion		Fenitrothion		Propoxur		Bendiocarb		Deltamethrin	
	1991	1992	1991	1992	1991	1992	1991	1992	1991	1992	1991	1992
Mexico	1,887,062	1,633,522	-	-	-	-	-	-	-	-	-	-
Belize	-	21,760	-	-	-	-	-	-	-	-	-	-
Costa Rica a)	-	-	9,088 b)	1,880	-	-	-	-	-	-	-	-
El Salvador	-	-	-	-	-	-	70,496	-	78,980	67,900	-	-
Guatemala	-	-	-	-	14,482 c)	16,905 c)	3,158	-	-	-	24,566	-
Honduras	-	-	-	-	83,217	68,524	-	-	-	-	-	-
Nicaragua	-	-	-	-	19,166	65,400 d)	-	-	-	-	18,670	(d)
Panama	-	-	-	-	26,093	37,184	-	-	-	-	-	-
Haiti	-	-	-	-	-	-	-	-	-	-	-	-
Dominican Rep.	8,429	226	-	-	-	-	-	-	-	-	-	-
French Guiana	-	-	-	-	-	-	-	-	-	-	-	-
Guyana	...	9,665 e)	...	...	...	...	...	...	...	...	...	8,600
Suriname	723	-	-	-	-	-	-	-	-	-	-	-
Brazil	1,527,169 f)	1,461,507	-	-	47,453	-	-	-	-	-	33,349	-
Bolivia	73,886	109,168	1,229	-	-	-	-	-	-	-	-	-
Colombia g)	279,691	264,910	-	-	11,331	22,483	-	-	-	-	90	-
Ecuador	282,491	181,157	30,265	6,858	-	8,300	-	-	-	-	-	-
Peru h)	43,124	670,272	-	-	-	-	-	-	-	-	-	-
Venezuela	120,046	135,635	-	-	82,092	74,117	-	-	120,046	-	33,349	50,479
Argentina	27,868 i)	25,331 i)	-	-	-	-	-	-	-	-	-	-
Paraguay	29,047	69,845	-	-	-	-	-	-	-	-	-	-
T O T A L	10,008,184	8,882,434	40,582	8,738	283,834	292,913	73,654	0	199,026	67,900	110,024	59,079

... Information not available.

- a) (COR) Sprayings up to August, 1992. b) (COR) Includes sprayings with Malathion & Propoxur. c) (GUT) In 1991 includes sprayings with deltamethrin, fenitrothion, propoxur and DDT & in 1992 sprayings with propoxur, fenitrothion & deltamethrin. d) (NIC) Includes sprayings with deltamethrin and fenitrothion. e) (GUY) Sprayings up to October 1992 f) (BRA) Includes sprayings with DDT, malathion & deltamethrin. g) (COL) In addition Col. applied 6,958 sprayings with lambda-cyhalothrin. h) (PER) 3,812 houses were sprayed with cyfluthrin. i) (ARG) Includes sprayings with DDT and K'otrin.

Table 13

INSECTICIDES USED IN MALARIA PROGRAMS. 1991 AND ESTIMATED 1992

Country	D D T (Kg)				Malathion 50%		Propoxur 50% (Kg.)		Fenitrothion 40% (Kg)		Other	
	1992		1993 (Est.)		1992	1993 (Est.)	1992	1993 (Est.)	1992	1993 (Est.)	1992	1993 (Est.)
	100%	75%	100%	75%								
Mexico	54,734	1,039,961	47,220	897,185	99,674	88,508	-	-	-	-	92,310 a)	32,260 a)
Belize	6,800	15,000	6,800	15,000	-	-	-	-	-	-	-	-
Costa Rica	-	-	-	-	4,306	4,500	346	400	-	-	3,906 b)	3,500 b)
El Salvador	-	-	-	-	-	-	-	-	-	-	13,900 c)	14,200 c)
Guatemala	-	-	-	-	-	-	15,487	60,000	13,742 d)	450,000	25,728 e)	65,000 e)
Honduras	-	-	-	-	-	-	-	-	85,514 f)	94,066 f)	-	-
Nicaragua	-	-	-	-	-	-	-	-	12,000	10,000	3,000 g)	3,000 g)
Panama	-	-	-	-	-	-	-	-	28,509 h)	60,000 h)	-	-
Haiti	-	-	-	-	-	-	-	-	-	-	-	-
Dominican Rep.	-	230	-	-	-	-	-	-	-	-	-	-
French Guiana	-	70	-	-	-	-	-	-	-	-	993 g)	-
Guyana	-	1,020	-	-	-	-	-	-	-	-	-	-
Suriname	-	-	40	100	-	-	-	-	-	-	-	-
Brazil	41,482	740,777	...	...	-	-	-	-	-	-	244,647 i)	...
Bolivia	-	41,076	-	-	-	-	-	-	-	-	-	-
Colombia	320	146,700	500	170,000	-	-	-	-	20,166	200,000	25,381 j)	48,500 j)
Ecuador	704	120,053	1,000	235,000	1,164	50,000	-	-	-	-	12,596 k)	10,000 k)
Peru	-	56,534	-	200,000	-	-	-	-	-	-	-	-
Venezuela	-	89,286	-	131,937	63,647	63,336	-	-	109,859 l)	205,808 l)	22,826 m)	34,198 m)
Argentina	420	1,000	7,046	10,000	...	...	...	...	...	...	1,411 n)	...
Paraguay	-	31,483	-	-	-	-	-	-	-	-	-	-
T O T A L	104,460	2,283,190	62,606	1,659,222	168,790	206,344	15,833	60,400	269,790	1,019,874	446,698	200,658

... Information not available.

- a) (MEX) In 1992 includes 87,879 Kg. Fenitrothion 2% and 4,440 Lt. Temephos 50% and 1993 29,900 kg. Fenitrothion 2% and 2,360 Lt. Temephos 50%.
b) (COR) In 1992 includes 6006 kg. Abate granules and 3,300 Lt. Malathion 95% and in 1993, 3,500 Lt. Malathion 95%. c) (COR) In 1992 5,350 Kg. Bendiocarb 80%; 360 Gls. Abate emulsifiable; 1,140 Gls. Permetrin 5% & 7,050 kg. Abate granules. In 1993 includes, 5,200 kg. Bendiocarb. 500 Gls. Abate emulsifiable, 1,500 Gls. Permetrin 5% and 7,000 Kg. Abate granules. d) (GUT) Includes Fenitrothion 2%.
e) (GUT) In 1992 includes 22,000 kg. deltametrin 2% and 3,728 kg. other insecticides and in 1993, 19kg. deltametrin and 15,000 kg. otros insecticides. f) (HON) In 1992 includes 84,856 Lt. Fenitrothion 50% and 658.6 kg. Fenitrothion 40%. In 1993 93,342 Lt. Fenitrothion 50% and 724.5 kg. Fenitrothion 40%. g) (NIC) Deltametrin 2.5%. h) (PAN) In 1992 includes 23,872 kg. Fenitrothion 40% and 4,636 Lt. Fenitrothion 50% and in 1993, 50,000 kg. and 10,000 respectively. i) (BRA) Includes 1,653 Lt. DDT, 229,969 Lt. Icon and 12,025 Lt. K'otrin. j) (COL) Includes lambdacyalotrin, deltametrin liquid and paste. k) (ECU) Liters of malathion 95%. l) (VEN) Includes Fenitrothion liquid and powder. m) Includes Deltametrin liquid and powder. n) (ARG) Includes K'otrin and Pirectrin.

Table 14

FUNDS FROM COUNTRY AND INTERNATIONAL AGENCIES FOR MALARIA RESEARCH
IN THE AMERICAN REGION, 1985 - 1991 a)

	1985	1986	1987	1988	1989	1990	1991	1992
International Development Research Center, Canada x)	38.433	...	...	364,157	53,831	254,264	239,545 a)	140,050 b)
Board on Science and Technology for International Development. Institute of Medicine/National Academy of Science, USA. x)	244,176	228,900	187,604	97,012	44,132	28,004	25,000 c)	-
National Institute Of Allergy and Infectious Disease, National Institute of Health, USA, +), d)	5,708,000	5,993,424	6,122,927	6,803,213	7,842,896	7,783,157	7,376,839	9,175,164
Agency For International Development, USA, +), e)	12,500,000	9,900,000	12,000,000	10,000,000	8,500,339	8,550,000	8,550,000	9,684,000
USA Army and USA Navy +), e)	5,220,000	8,240,000	8,611,000	8,631,000	6,303,000	6,014,000	10,163,000	19,600,000
Pan American Health Organization World Health Organization (PAHO/WHO) x)	334,600	488,125	741,400	99,883	454,000	490,614	400,000	367,176
Special Programme for Research and Training in Tropical Disease UNDP/World Bank (TDR) x)	1,756,432	1,364,449	1,446,211	1,746,119	2,120,128	2,519,634	2,849,100	3,074,292
Brazil ** x)	...	250,000	759,248	50,000	532,930	30,000	261,072 f)	...
Colombia ** x)	...	25,000	80,000	...	...	...	...	1,287,203
Mexico ** x)	...	50,000	270,000	339,337	812,528	426,546	583,839	815,765

* In USA dollars, except otherwise indicated.

x) Calendar year, 1991/92. +) Fiscal year, Oct. 1991-Oct.1992.

a) Canadian Dollars, Project in Peru. b) Canadian Dollars, Project in Brazil. c) Field Research on mosquitoes.

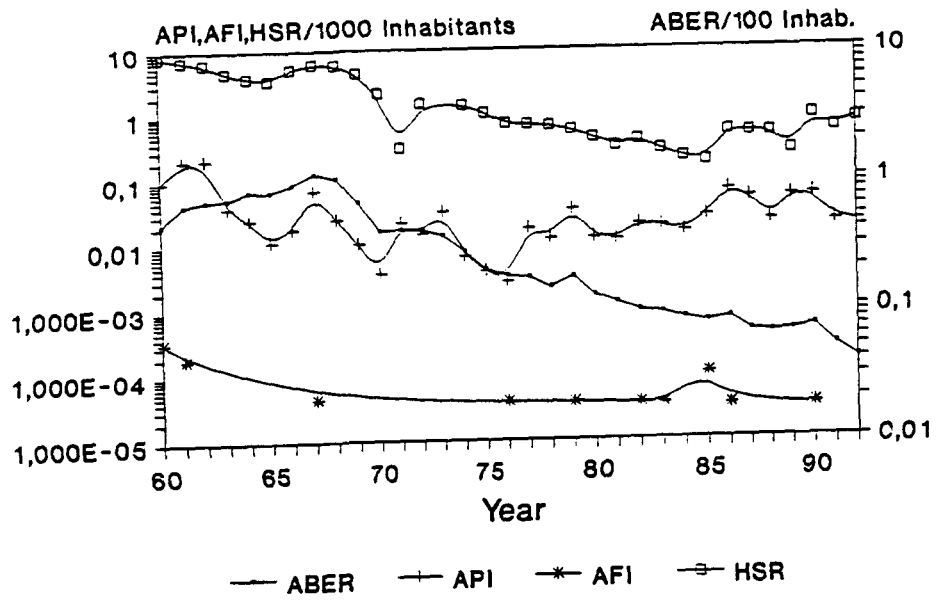
d) Funds for Institutions in the USA e) Most of the funds for Institutions in the USA.

f) Funds from CNPq, FAPESP and FNS.

Aug/30/93

COUNTRIES WITH ACTIVE MALARIA CONTROL PROGRAM

ARGENTINA - Malarionetric rates 1960-1992



ARGENTINA - MALARIOMETRIC RATES

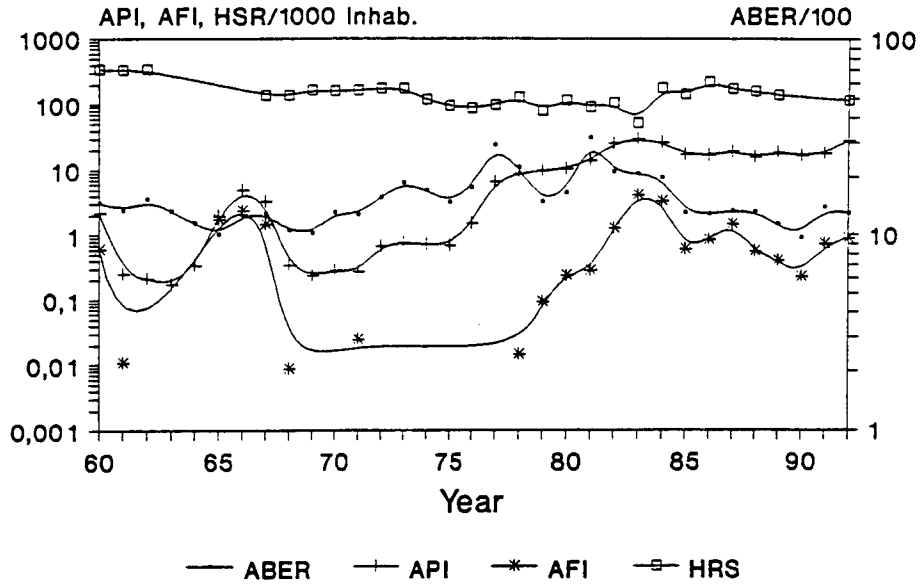
Year	Total population	Blood slides examined							Sprayings			
		Number	ABER	Positive	API	P. falc. & Assoc. P. vivax	Other species	AFI	AVI	Number of sprayings	HSR	
		(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)	(j)	(k)	(l)
1960	20,476	21,868	0.11	1,094	0.05	-	1,094	-	0.00	0.05	57,995	2.83
	20,611	96,629	0.47	2,039	0.10	7	2,032	-	0.00	0.10	173,008	8.39
	20,930	137,859	0.66	4,541	0.22	4	4,537	-	0.00	0.22	152,725	7.30
	21,245	152,151	0.72	4,708	0.22	-	4,705	3	0.00	0.22	136,994	6.45
	21,558	157,410	0.73	845	0.04	-	843	2	0.00	0.04	101,369	4.70
1965	21,868	181,722	0.83	554	0.03	-	554	-	0.00	0.03	84,402	3.86
	22,179	182,881	0.82	254	0.01	-	249	5	0.00	0.01	78,664	3.55
	22,488	211,281	0.94	411	0.02	-	410	1	0.00	0.02	117,704	5.23
	22,800	259,335	1.14	1,620	0.07	1	1,618	1	0.00	0.07	142,013	6.23
	23,113	240,859	1.04	579	0.03	-	579	-	0.00	0.03	138,248	5.98
1970	23,428	159,178	0.68	247	0.01	-	247	-	0.00	0.01	101,738	4.34
	23,748	95,410	0.40	86	0.00	-	86	-	0.00	0.00	50,000	2.11
	24,068	99,695	0.41	518	0.02	-	517	1	0.00	0.02	7,368	0.31
	24,392	99,806	0.41	359	0.01	-	359	-	0.00	0.01	36,048	1.48
	24,820	92,241	0.37	805	0.03	-	805	-	0.00	0.03	-	0.00
1975	25,620	71,168	0.28	171	0.01	-	171	-	0.00	0.01	35,156	1.37
	26,052	52,015	0.20	100	0.00	-	100	-	0.00	0.00	27,105	1.04
	26,483	47,610	0.18	70	0.00	1	69	-	0.00	0.00	18,951	0.72
	26,915	46,841	0.17	463	0.02	-	463	-	0.00	0.02	18,330	0.68
	27,349	39,922	0.15	325	0.01	-	325	-	0.00	0.01	17,918	0.66
1980	27,789	48,945	0.18	936	0.03	1	935	-	0.00	0.03	15,440	0.56
	28,237	35,501	0.13	341	0.01	-	341	-	0.00	0.01	11,960	0.42
	28,694	31,431	0.11	323	0.01	-	323	-	0.00	0.01	9,005	0.31
	29,157	27,803	0.10	567	0.02	1	566	-	0.00	0.02	11,393	0.39
	29,625	27,020	0.09	535	0.02	1	534	-	0.00	0.02	8,057	0.27
1985	30,094	24,943	0.08	437	0.01	-	436	1	0.00	0.01	6,199	0.21
	30,331	23,611	0.08	774	0.03	3	770	1	0.00	0.03	5,374	0.18
	31,737	26,345	0.08	2,000	0.06	1	1,999	-	0.00	0.06	16,381	0.52
	31,138	20,419	0.07	1,521	0.05	-	1,521	-	0.00	0.07	15,312	0.49
	31,536	20,028	0.06	666	0.02	-	664	2	0.00	0.03	15,262	0.48
1990	31,930	21,080	0.07	1,620	0.05	-	1,620	-	0.00	0.08	8,165	0.26
	32,322	22,624	0.07	1,660	0.05	1	1,659	-	0.00	0.07	27,865	0.86
	32,712	16,844	0.05	803	0.02	3	800	-	0.00	0.05	27,865	0.85
1992 m)	33,100	13,619	0.04	643	0.02	-	643	-	0.00	0.05	25,331	0.77

- a) Population in thousands, estimated by PAHO, Technical Information System.
 b) Number thick blood films examined during the year.
 c) ABER = Annual Blood Examination Rate, per 100 inhabitants.
 d) Number of positive slides, i.e., showing Plasmodium in at least 100 microscopic fields.
 e) API = Annual Parasite Index, per 1000 inhabitants.
 f) Number of slides showing P. falciparum and other associated plasmodia.
 g) Number of slides showing P. vivax.
 h) Number of slides showing P. malariae and/or P. ovale.
 i) AFI = Annual P. falciparum Index during the year, per 1000 inhabitants.
 j) AVI = Annual P. vivax Index during the year, per 1000 inhabitants.
 k) Number of house sprayings during the year, regardless of cycles and insecticides.
 l) HSR = House spraying rate, per 1000 inhabitants.
 m) Information from "Pop. Division of the UN Secretariat, World Population Prospects. The 1992 Revision."

Sep/7/93

BELIZE - Malarionetric Rates

1960-1992



BELIZE - MALARIOMETRIC RATES

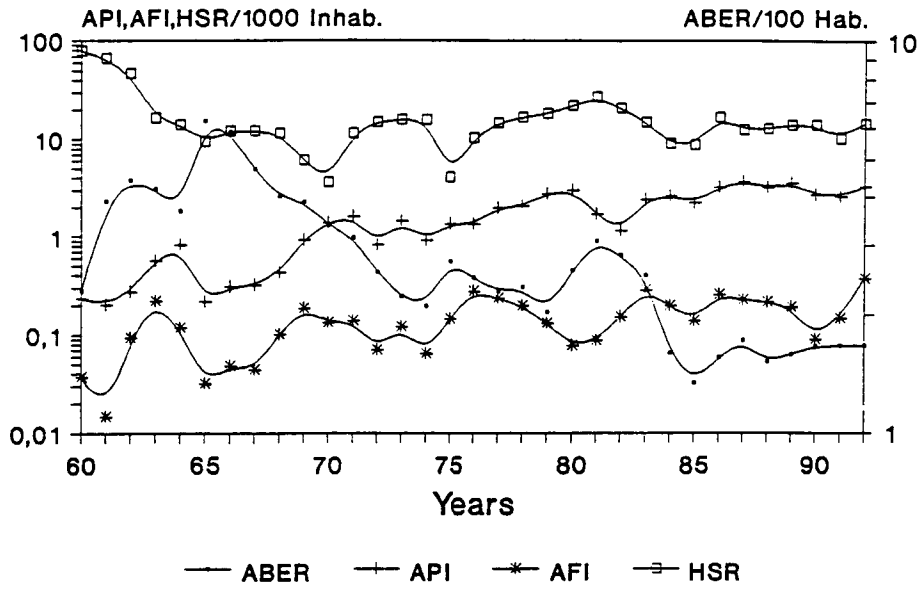
Year	Total population	Blood slides examined							Sprayings			
		Number	ABER	Positive	API	P. falc. & Assoc.	P. vivax	Other species	AFI	AVI	Number of sprayings	HSR
		(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)	(j)	(k)	(l)
1960	88	11,307	12.85	1,019	11.58	712	211	96	8.09	2.40	22,526	255.98
	91	13,307	14.62	196	2.15	55	138	3	0.60	1.52	31,008	340.75
	93	12,355	13.28	23	0.25	1	22	-	0.01	0.24	31,410	337.74
	95	14,566	15.32	20	0.21	-	20	-	0.00	0.21	32,566	342.80
	99	13,085	13.22	17	0.17	-	17	-	0.00	0.17	-	0.00
1965	103	11,826	11.48	35	0.34	-	35	-	0.00	0.34	-	0.00
	107	10,787	10.08	206	1.93	188	18	-	1.76	0.17	-	0.00
	111	13,920	12.54	552	4.97	260	292	-	2.34	2.63	-	0.00
	115	14,773	12.85	375	3.26	170	205	-	1.48	1.78	15,820	137.57
	116	12,271	10.58	39	0.34	1	38	-	0.01	0.33	16,095	138.75
1970	120	12,194	10.16	28	0.23	-	28	-	0.00	0.23	19,593	163.28
	120	15,522	12.94	33	0.28	-	33	-	0.00	0.28	19,215	160.13
	124	15,703	12.66	33	0.27	3	30	-	0.02	0.24	20,132	162.35
	128	19,836	15.50	86	0.67	-	86	-	0.00	0.67	22,298	174.20
	132	24,414	18.50	99	0.75	-	99	-	0.00	0.75	23,080	174.85
1975	136	23,100	16.99	96	0.71	-	96	-	0.00	0.71	15,890	116.84
	131	19,116	14.59	90	0.69	-	90	-	0.00	0.69	12,379	94.50
	134	23,513	17.55	199	1.49	-	199	-	0.00	1.49	11,752	87.70
	136	39,151	28.79	894	6.57	-	894	-	0.00	6.57	13,300	97.79
	139	30,818	22.17	1,218	8.76	2	1,216	-	0.01	8.75	17,768	127.83
1980	142	20,952	14.75	1,391	9.80	13	1,378	-	0.09	9.70	11,399	80.27
	145	23,925	16.50	1,529	10.54	34	1,495	-	0.23	10.31	16,835	116.10
	148	46,460	31.39	2,041	13.79	41	2,000	-	0.28	13.51	13,353	90.22
	152	31,945	21.02	3,868	25.45	191	3,677	-	1.26	24.19	15,954	104.96
	155	31,889	20.57	4,595	29.65	634	3,961	-	4.09	25.55	8,046	51.91
1985	158	31,146	19.71	4,117	26.06	521	3,596	-	3.30	22.76	28,228	178.66
	161	20,905	12.98	2,800	17.39	97	2,703	-	0.60	16.79	22,935	142.45
	164	20,859	12.72	2,779	16.95	136	2,643	-	0.83	16.12	36,452	222.27
	168	22,139	13.18	3,258	19.39	248	3,004	6	1.48	17.88	29,324	174.55
	171	22,403	13.10	2,725	15.94	95	2,617	13	0.56	15.30	27,163	158.85
1990	175	19,806	11.32	3,285	18.77	70	3,208	7	0.40	18.33	24,460	139.77
	178	17,204	9.67	3,033	17.04	40	2,987	6	0.22	16.78	...	0.00
	182	25,281	13.89	3,317	18.23	131	3,181	5	0.72	17.48	...	0.00
1992	186	24,135	12.98	5,341	28.72	165	5,175	1	0.89	27.82	21,760	116.99

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- a) Population in thousands, estimated by PAHO, Technical Information System. Sep/7/93
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- g) Number of slides showing *P. vivax*.
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- k) Number of house sprayings during the year, regardless of cycles and insecticides.
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- m) Information from "Pop. Division of the UN Secretariat, World Population Prospects. The 1992 Revision."

BOLIVIA - Malaria Metrics Rates

1960-1992



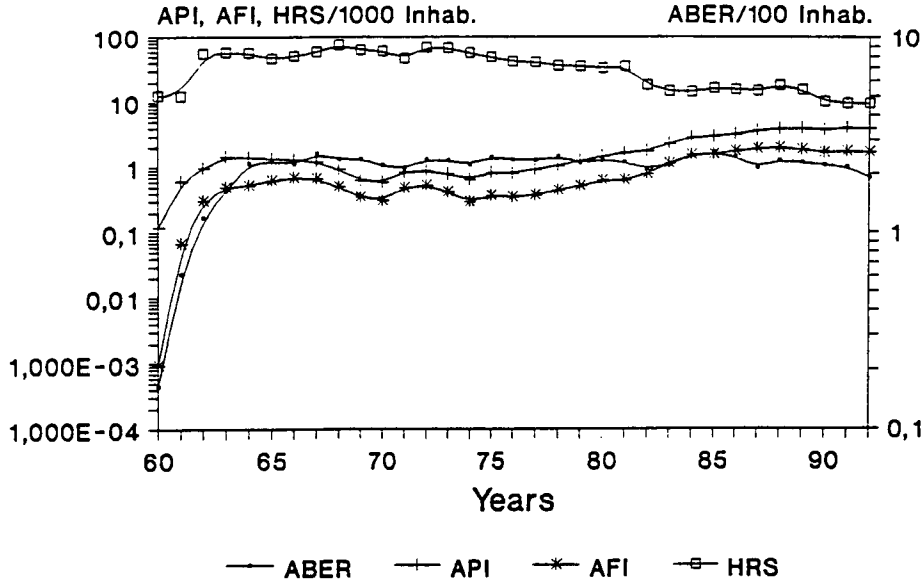
BOLIVIA - MALARIOMETRIC RATES

Year	Total population	Blood slides examined							Sprayings			
		Number	ABER	Positive	API	P.falc. & Assoc.	Other		Number of sprayings	HSR		
							P.vivaspecies	AFI				
(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)	(j)	(k)	(l)	
1960	3,616	83,762	2.32	1,970	0.54	243	1,419	308	0.07	0.39	286,827	79.32
	3,825	87,775	2.29	893	0.23	143	621	129	0.04	0.16	301,995	78.95
	3,920	153,008	3.90	796	0.20	58	725	13	0.01	0.18	262,670	67.01
	4,019	177,528	4.42	1,110	0.28	378	721	11	0.09	0.18	188,193	46.83
	4,121	173,019	4.20	2,345	0.57	910	1,435	-	0.22	0.35	67,510	16.38
1965	4,226	155,540	3.68	3,454	0.82	497	2,955	2	0.12	0.70	59,669	14.12
	4,334	270,754	6.25	941	0.22	138	801	2	0.03	0.18	40,991	9.46
	4,446	260,145	5.85	1,373	0.31	214	1,159	-	0.05	0.26	53,591	12.05
	4,561	214,537	4.70	1,442	0.32	200	1,242	-	0.04	0.27	54,987	12.06
	4,680	187,635	4.01	1,998	0.43	472	1,526	-	0.10	0.33	53,214	11.37
1970	4,770	185,299	3.88	4,425	0.93	891	3,534	-	0.19	0.74	29,035	6.09
	4,931	167,265	3.39	6,862	1.39	651	6,211	-	0.13	1.26	17,797	3.61
	5,063	158,786	3.14	8,080	1.60	699	7,381	-	0.14	1.46	58,251	11.51
	5,195	132,750	2.56	4,275	0.82	364	3,911	-	0.07	0.75	77,492	14.92
	5,331	118,417	2.22	7,696	1.44	640	7,056	-	0.12	1.32	84,406	15.83
1975	5,470	114,805	2.10	4,936	0.90	349	4,586	1	0.06	0.84	86,477	15.81
	4,894	133,605	2.73	6,615	1.35	711	5,903	1	0.15	1.21	19,867	4.06
	5,021	124,101	2.47	6,714	1.34	1,383	5,331	-	0.28	1.06	52,055	10.37
	5,151	118,002	2.29	10,106	1.96	1,211	8,895	-	0.24	1.73	75,191	14.60
	5,286	124,082	2.35	10,897	2.06	1,042	9,855	-	0.20	1.86	88,449	16.73
1980	5,426	110,235	2.03	14,873	2.74	710	14,163	-	0.13	2.61	98,409	18.14
	5,570	143,648	2.58	16,619	2.98	432	16,187	-	0.08	2.91	122,018	21.91
	5,720	176,235	3.08	9,774	1.71	496	9,278	-	0.09	1.62	154,572	27.02
	5,874	166,124	2.83	6,699	1.14	885	5,814	-	0.15	0.99	122,384	20.83
	6,034	151,187	2.51	14,441	2.39	1,713	12,728	-	0.28	2.11	89,551	14.84
1985	6,200	99,003	1.60	16,338	2.64	1,218	15,120	-	0.20	2.44	56,145	9.06
	6,371	85,378	1.34	14,354	2.25	890	13,454	-	0.14	2.11	56,205	8.82
	6,547	101,878	1.56	20,993	3.21	1,674	19,319	9	0.26	2.95	109,926	16.79
	6,730	115,512	1.72	24,891	3.70	1,512	23,379	-	0.22	3.47	84,588	12.57
	6,918	104,888	1.52	22,258	3.22	1,494	20,764	-	0.22	3.00	89,348	12.92
1990	7,113	112,770	1.59	25,367	3.57	1,363	24,004	-	0.19	3.37	99,640	14.01
	7,314	121,743	1.66	19,680	2.69	652	19,028	-	0.09	2.60	99,989	13.67
	1991	7,521	125,509	1.67	19,031	2.53	1,103	17,928	0	0.15	2.38	75,115	9.99
1992 m)	7,524	125,414	1.67	24,486	3.25	2,757	21,729	0	0.37	2.89	109,168	14.51

- a) Population in thousands, estimated by PAHO, Technical Information System.
 b) Number thick blood films examined during the year.
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 d) Number of positive slides, i.e., showing Plasmodium in at least 100 microscopic fields.
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 f) Number of slides showing *P. falciparum* and other associated plasmodia.
 g) Number of slides showing *P. vivax*.
 h) Number of slides showing *P. malariae* and/or *P. ovale*.
 i) AFI = Annual *P. falciparum* Index during the year, per 1000 inhabitants.
 j) AVI = Annual *P. vivax* Index during the year, per 1000 inhabitants.
 k) Number of house sprayings during the year, regardless of cycles and insecticides.
 l) HSR = House spraying rate, per 1000 inhabitants.
 m) Information from "Pop. Division of the UN Secretariat, World Population Prospects. The 1992 Revision."

BRAZIL - Malarionetric Rates

1960-1992



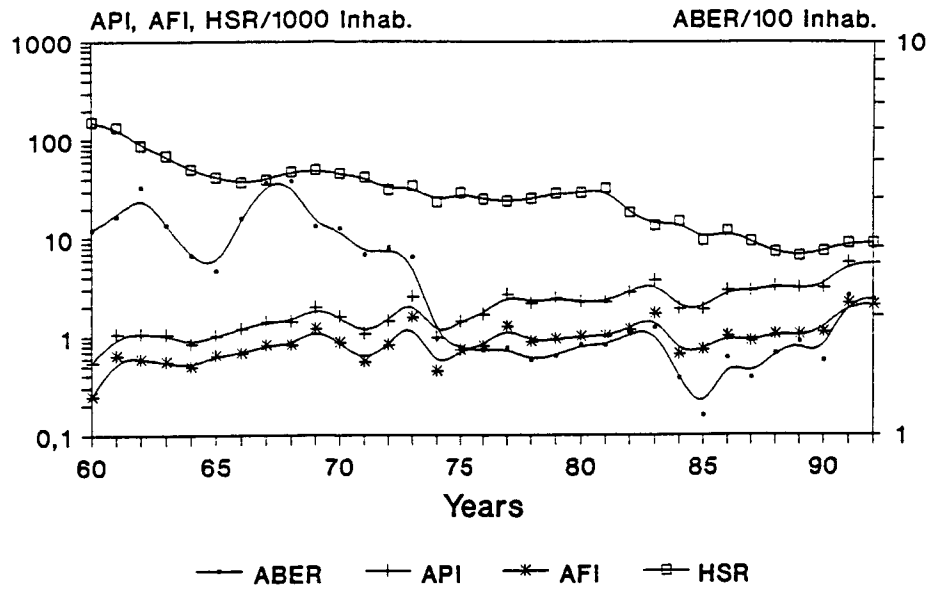
BRAZIL - MALARIOMETRIC RATES

Year	Total Year population (a)	Blood slides examined						Sprayings					
		Number (b)	ABER (c)	Positive (d)	API (e)	P. falc. & Assoc. P. vivax (f)	Other species (g)	AFI (i)	AVI (j)	Number of sprayings (k)	HSR (l)		
1960	67,711	69,720	114,622	0.16	8,297	0.12	66	8,230	1	0.00	0.12	873,746	12.53
		71,868	438,707	0.61	44,188	0.61	4,883	39,300	5	0.07	0.55	881,920	12.27
		74,096	884,434	1.19	72,060	0.97	22,910	49,142	8	0.31	0.66	4,081,914	55.09
		76,526	1,245,674	1.63	111,417	1.46	37,929	73,388	100	0.50	0.96	4,419,463	57.75
		78,730	1,775,864	2.26	111,278	1.41	42,041	69,180	57	0.53	0.88	4,481,579	56.92
1965	81,006	1,874,955	2.31	110,306	1.36	51,273	58,925	108	0.63	0.73	3,757,685	46.39	
		82,930	1,854,939	2.24	108,630	1.31	57,728	50,654	248	0.70	0.61	4,222,505	50.92
		85,240	2,151,470	2.52	102,842	1.21	57,266	45,348	228	0.67	0.53	5,006,241	58.73
		87,620	2,081,679	2.38	81,324	0.93	44,289	36,799	236	0.51	0.42	6,584,083	75.14
		90,070	2,139,885	2.38	56,951	0.63	31,346	25,454	151	0.35	0.28	5,725,743	63.57
1970	92,520	2,030,459	2.19	54,644	0.59	28,557	25,935	152	0.31	0.28	5,642,025	60.98	
		95,170	2,012,625	2.11	80,293	0.84	46,605	33,597	91	0.49	0.35	4,462,581	46.89
		97,850	2,291,682	2.34	85,325	0.87	51,420	33,845	60	0.53	0.35	6,826,559	69.77
		99,920	2,329,563	2.33	79,161	0.79	42,002	37,107	52	0.42	0.37	6,724,621	67.30
		102,400	2,271,691	2.22	66,481	0.65	29,997	36,393	91	0.29	0.36	5,761,532	56.26
1975	108,032	2,617,755	2.42	88,630	0.82	39,572	49,020	38	0.37	0.45	5,282,378	48.90	
		110,592	2,600,871	2.35	89,765	0.81	38,397	51,331	37	0.35	0.46	4,648,871	42.04
		113,197	2,638,765	2.33	104,436	0.92	42,027	62,381	28	0.37	0.55	4,643,422	41.02
		115,849	2,825,890	2.44	121,577	1.05	51,568	69,983	26	0.45	0.60	4,191,780	36.18
		118,545	2,691,966	2.27	147,630	1.25	60,916	86,693	21	0.51	0.73	4,180,295	35.26
1980	121,286	2,838,643	2.34	176,237	1.45	75,920	100,302	15	0.63	0.83	4,016,014	33.11	
		124,070	2,839,488	2.29	205,544	1.66	77,779	119,431	2	0.63	0.96	4,382,444	35.32
		126,895	2,672,904	2.11	221,939	1.75	98,999	122,934	6	0.78	0.97	2,334,628	18.40
		129,757	2,881,660	2.22	297,687	2.29	147,504	150,169	14	1.14	1.16	1,900,883	14.65
		132,648	3,277,492	2.47	378,257	2.85	206,414	171,836	7	1.56	1.30	1,888,740	14.24
1985	135,564	3,452,943	2.55	401,904	2.96	214,193	187,706	5	1.58	1.38	2,241,251	16.53	
		138,502	3,363,962	2.43	443,627	3.20	243,761	199,857	9	1.76	1.44	2,190,413	15.82
		141,459	3,034,540	2.15	508,864	3.60	270,458	238,403	3	1.91	1.69	2,127,939	15.04
		144,427	3,373,283	2.34	559,535	3.87	287,750	271,784	1	1.99	1.88	2,626,667	18.19
		147,399	3,368,564	2.29	577,520	3.92	275,674	301,841	5	1.87	2.05	2,332,347	15.82
1990 m	150,368	3,294,234	2.19	560,396	3.73	252,191	308,184	21	1.68	2.05	1,527,169	10.16	
(m)	153,330	3,283,016	2.14	614,431	4.01	265,597	348,722	112	1.73	2.27	1,438,100	9.38	
1992 m	154,113	2,955,196	1.92	609,860	3.96	267,054	342,650	156	1.73	2.22	1,481,507	9.61	

- a) Population in thousands, estimated by PAHO, Technical Information System. Sep/7/93
- b) Number thick blood films examined during the year.
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COLOMBIA - Malarionetric Rates

1960-1992



COLOMBIA - MALARIOMETRIC RATES

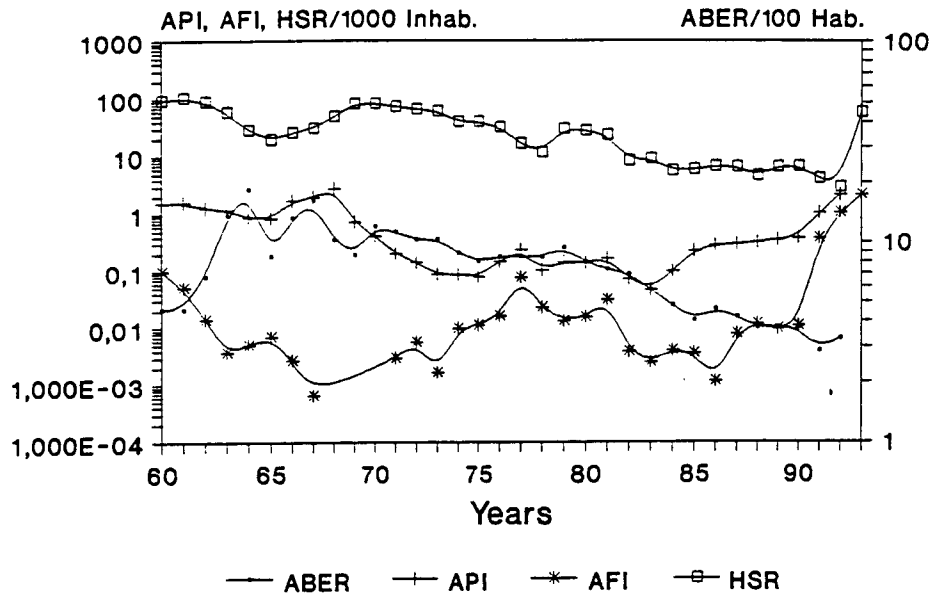
Year	Total population	Blood slides examined							Sprayings			
		Number	ABER	Positive	API	P. falc. & Assoc.		Other species	AFI	AVI	Number of sprayings	HSR
						P. vivax						
(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)	(j)	(k)	(l)	
1960	14,938	329,288	2.20	4,172	0.28	1,195	2,942	35	0.08	0.20	2,357,627	157.83
	15,416	509,920	3.31	8,426	0.55	3,758	4,642	26	0.24	0.30	2,358,989	153.02
	15,908	570,160	3.58	16,974	1.07	10,235	6,694	45	0.64	0.42	2,127,057	133.71
	16,417	697,245	4.25	17,497	1.07	9,718	7,745	34	0.59	0.47	1,431,774	87.21
	16,941	577,406	3.41	17,898	1.06	9,375	8,499	24	0.55	0.50	1,163,280	68.67
1965	17,485	499,523	2.86	14,729	0.84	8,648	6,058	23	0.49	0.35	871,294	49.83
	17,996	470,708	2.62	18,277	1.02	11,593	6,668	16	0.64	0.37	744,002	41.34
	18,468	655,897	3.55	22,135	1.20	12,512	9,610	13	0.68	0.52	677,228	36.67
	18,956	827,511	4.37	26,633	1.40	15,626	10,944	63	0.82	0.58	741,895	39.14
	19,462	858,857	4.41	27,333	1.40	15,964	11,344	25	0.82	0.58	916,892	47.11
1970	19,984	676,866	3.39	39,435	1.97	24,092	15,326	17	1.21	0.77	980,578	49.07
	20,527	685,412	3.34	32,272	1.57	17,975	14,280	17	0.88	0.70	922,943	44.96
	21,088	604,773	2.87	22,402	1.06	11,722	10,675	5	0.56	0.51	873,910	41.44
	21,668	646,399	2.98	30,997	1.43	17,709	13,282	6	0.82	0.61	671,412	30.99
	22,343	631,563	2.83	56,494	2.53	34,635	21,855	4	1.55	0.98	754,124	33.75
1975	22,981	404,120	1.76	22,406	0.97	10,275	12,127	4	0.45	0.53	533,332	23.21
	23,177	385,691	1.66	32,690	1.41	16,880	16,880	10	0.73	0.73	663,863	28.64
	23,672	386,897	1.63	39,022	1.65	18,827	20,185	10	0.80	0.85	589,367	24.90
	24,183	401,621	1.66	63,888	2.64	30,344	33,496	48	1.25	1.39	573,765	23.73
	24,707	381,978	1.55	53,412	2.16	21,741	31,600	71	0.88	1.28	618,052	25.02
1980	25,245	401,005	1.59	60,957	2.41	23,621	37,267	69	0.94	1.48	714,348	28.30
	25,794	436,275	1.69	57,346	2.22	25,658	31,663	25	0.99	1.23	738,538	28.63
	27,497	463,864	1.69	60,972	2.22	27,909	33,047	16	1.01	1.20	872,088	31.72
	28,088	505,220	1.80	78,601	2.80	32,916	45,650	35	1.17	1.63	506,585	18.04
	28,680	535,962	1.87	105,360	3.67	47,957	57,362	41	1.67	2.00	380,043	13.25
1985	29,277	407,627	1.39	55,268	1.89	19,411	35,776	81	0.66	1.22	429,845	14.68
	29,879	334,062	1.12	55,791	1.87	21,921	34,291	86	0.73	1.15	280,988	9.40
	30,488	477,503	1.57	89,251	2.93	30,526	58,612	113	1.00	1.92	362,410	11.89
	31,103	434,646	1.40	90,014	2.89	27,749	62,250	15	0.89	2.00	287,152	9.23
	31,723	510,526	1.61	100,850	3.18	33,106	67,689	55	1.04	2.13	228,323	7.20
1990 m	32,348	557,129	1.72	100,286	3.10	33,540	66,691	55	1.04	2.06	213,854	6.61
	32,300	496,087	1.54	99,489	3.08	35,490	63,855	144	1.10	1.98	237,053	7.34
	(m) 32,861	740,938	2.25	184,156	5.60	70,868	113,173	115	2.16	3.44	291,012	8.86
1992 m	33,424	736,498	2.20	184,023	5.51	69,274	114,690	59	2.07	3.43	294,351	8.81

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Sep/7/93

COSTA RICA- Malaria Metrics Rates 1960-1992



COSTA RICA - MALARIOMETRIC RATES

Year	Total population	Blood slides examined							Sprayings			
		Number	ABER	Positive	API	<u>P. falc.</u> & Assoc.	<u>P. vivax</u>	Other species	AFI	AVI	Number of sprayings	HSR
		(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)	(j)	(k)	(l)
1960	1,200	55,524	4.63	1,899	1.58	121	1,775	3	0.10	1.48	112,162	93.47
	1,254	57,603	4.59	2,000	1.59	64	1,936	-	0.05	1.54	131,942	105.22
	1,298	87,889	6.77	1,673	1.29	18	1,655	-	0.01	1.28	115,513	88.99
	1,343	183,642	13.67	1,583	1.18	5	1,577	1	0.00	1.17	78,386	58.37
	1,391	257,850	18.54	1,228	0.88	7	1,221	-	0.01	0.88	39,456	28.37
1965	1,439	123,285	8.57	1,212	0.84	10	1,202	-	0.01	0.84	28,088	19.52
	1,490	197,751	13.27	2,563	1.72	4	2,559	-	0.00	1.72	38,049	25.54
	1,541	250,135	16.23	3,047	1.98	1	3,046	-	0.00	1.98	47,683	30.94
	1,590	164,109	10.32	4,443	2.79	0	4,443	-	0.00	2.79	78,646	49.46
	1,634	142,029	8.69	1,191	0.73	0	1,191	-	0.00	0.73	132,618	81.16
1970	1,685	202,362	12.01	688	0.41	0	688	-	0.00	0.41	138,241	82.04
	1,727	195,484	11.32	350	0.20	5	344	1	0.00	0.20	125,344	72.58
	1,798	185,011	10.29	257	0.14	10	247	-	0.01	0.14	116,907	65.02
	1,843	191,152	10.37	159	0.09	3	156	-	0.00	0.08	110,578	60.00
	1,873	166,355	8.88	161	0.09	18	143	-	0.01	0.08	74,048	39.53
1975	1,922	154,656	8.05	152	0.08	21	131	-	0.01	0.07	75,629	39.35
	1,965	166,814	8.49	290	0.15	31	259	-	0.02	0.13	62,454	31.78
	2,022	171,753	8.49	473	0.23	155	318	-	0.08	0.16	33,194	16.42
	2,083	175,973	8.45	217	0.10	47	170	-	0.02	0.08	24,083	11.56
	2,148	202,284	9.42	307	0.14	28	285	-	0.01	0.13	64,545	30.05
1980	2,213	176,219	7.96	308	0.14	33	274	-	0.01	0.12	61,800	27.93
	2,279	166,894	7.32	376	0.16	69	307	-	0.03	0.13	53,205	23.35
	2,354	162,861	6.92	168	0.07	9	159	-	0.00	0.07	19,868	8.44
	2,424	139,019	5.74	110	0.05	6	104	-	0.00	0.04	21,821	9.00
	2,496	120,116	4.81	245	0.10	10	235	-	0.00	0.09	14,155	5.67
1985	2,569	103,987	4.05	569	0.22	9	560	-	0.00	0.22	14,994	5.84
	2,642	121,456	4.60	734	0.28	3	731	-	0.00	0.28	17,814	6.74
	2,716	113,720	4.19	790	0.29	21	768	-	0.01	0.28	17,559	6.47
	2,791	103,456	3.71	883	0.32	32	851	-	0.01	0.30	12,899	4.62
	2,866	106,611	3.72	1,016	0.35	27	989	-	0.01	0.35	18,725	6.53
1990 m)	2,940	108,614	3.69	699	0.24	31	668	-	0.01	0.23	19,664	6.69
1991 m)	3,035	113,167	3.73	1,151	0.38	5	1,146	-	0.00	0.38	12,709	4.19
1992 m)*	3,113	88,324	2.84	3,273	1.05	22	3,251	-	0.01	1.04	9,088	2.92
	3,192	105,131	3.29	6,951	2.18	16	6,935	-	0.01	2.17	1,880	0.59

a) Population in thousands, estimated by PAHO, Technical Information System.

b) Number thick blood films examined during the year.

c) ABER = Annual Blood Examination Rate, per 100 inhabitants.

d) Number of positive slides, i.e., showing Plasmodium in at least 100 microscopic fields.

e) API = Annual Parasite Index, per 1000 inhabitants.

f) Number of slides showing P. falciparum and other associated plasmodia.

g) Number of slides showing P. vivax.

h) Number of slides showing P. malariae and/or P. ovale.

i) AFI = Annual P. falciparum Index during the year, per 1000 inhabitants.

j) AVI = Annual P. vivax Index during the year, per 1000 inhabitants.

k) Number of house sprayings during the year, regardless of cycles and insecticides.

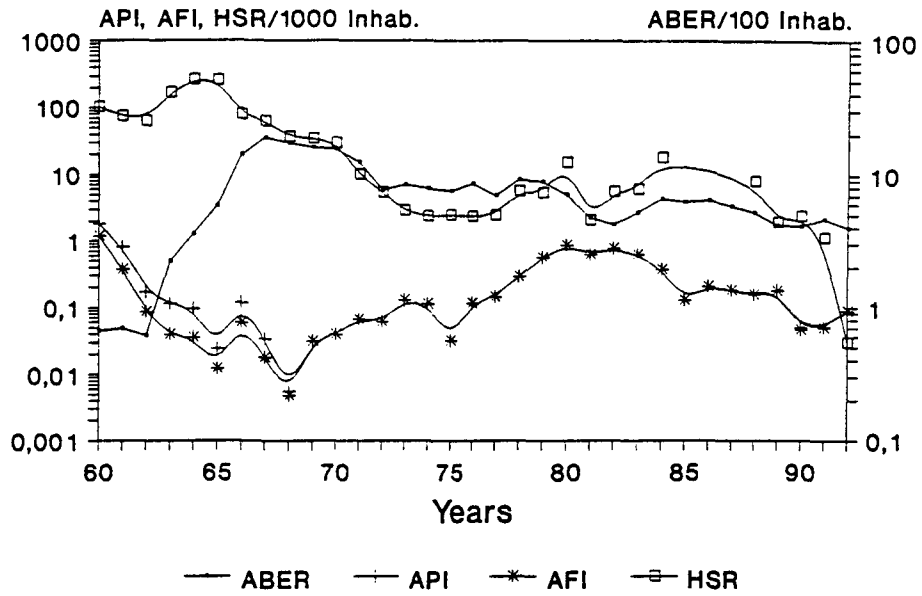
l) HSR = House spraying rate, per 1000 inhabitants.

m) Information from "Pop. Division of the UN Secretariat, World Population Prospects. The 1992 Revision."

* Inf. up to September

Sep/7/93

DOMINICAN REP. - Malarionetric Rates 1960-1992



MALARIOMETRIC RATES - DOMINICAN REPUBLIC

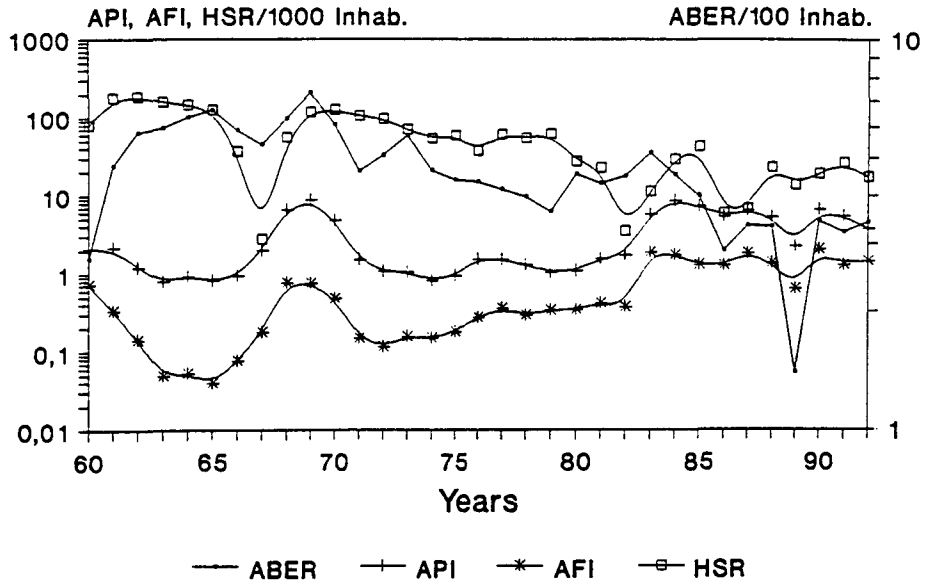
Year	Total population	Blood slides examined							Sprayings			
		Number	ABER	Positive	API	P. falc. & Assoc.	P. vivax	Other species	AFI	AVI	Number of sprayings	HSR
		(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)	(j)	(k)	(l)
1960	2,927	28,721	0.98	3,743	1.28	1,976	1,767	-	0.68	0.60	393,896	134.57
	3,038	20,337	0.67	5,540	1.82	3,591	1,949	-	1.18	0.64	309,716	101.95
	3,128	21,946	0.70	2,523	0.81	1,165	1,358	-	0.37	0.43	231,127	73.89
	3,220	19,742	0.61	548	0.17	277	271	-	0.09	0.08	201,109	62.46
	3,315	73,352	2.21	386	0.12	130	256	-	0.04	0.08	549,554	165.78
1965	3,412	121,211	3.55	321	0.09	120	201	-	0.04	0.06	891,727	261.35
	3,513	205,836	5.86	84	0.02	43	41	-	0.01	0.01	911,536	259.48
	3,616	505,130	13.97	429	0.12	216	213	-	0.06	0.06	288,765	79.86
	3,723	702,520	18.87	127	0.03	66	61	-	0.02	0.02	234,656	63.03
	3,833	655,202	17.09	21	0.01	18	3	-	0.00	0.00	140,220	36.58
1970	3,946	629,695	15.96	124	0.03	123	1	-	0.03	0.00	136,189	34.51
	4,062	628,221	15.47	161	0.04	161	1	-	0.04	0.00	120,812	29.74
	4,182	514,596	12.31	277	0.07	276	1	-	0.07	0.00	41,059	9.82
	4,305	329,394	7.65	261	0.06	261	-	-	0.06	0.00	23,078	5.36
	4,480	374,880	8.37	569	0.13	569	-	-	0.13	0.00	12,793	2.86
1975	4,610	360,782	7.83	520	0.11	520	-	-	0.11	0.00	10,825	2.35
	4,945	374,478	7.57	159	0.03	159	-	-	0.03	0.00	12,301	2.49
	5,070	436,068	8.60	586	0.12	585	1	-	0.12	0.00	11,992	2.37
	5,191	364,800	7.03	745	0.14	745	-	-	0.14	0.00	12,788	2.46
	5,311	489,095	9.21	1,531	0.29	1,531	-	-	0.29	0.00	29,965	5.64
1980	5,432	478,832	8.82	3,080	0.57	3,080	-	-	0.57	0.00	28,647	5.27
	5,558	390,770	7.03	4,780	0.86	4,779	1	-	0.86	0.00	84,501	15.20
	5,688	273,498	4.81	3,596	0.63	3,596	-	-	0.63	0.00	11,868	2.09
	5,977	251,542	4.21	4,654	0.78	4,653	1	-	0.78	0.00	33,206	5.56
	6,122	321,589	5.25	3,801	0.62	3,801	-	-	0.62	0.00	37,048	6.05
1985	6,268	413,416	6.60	2,370	0.38	2,370	-	-	0.38	0.00	113,717	18.14
	6,416	404,575	6.31	816	0.13	815	1	-	0.13	0.00	-	-
	6,566	427,694	6.51	1,360	0.21	1,359	-	-	0.21	0.00	-	-
	6,716	391,345	5.83	1,206	0.18	1,204	2	-	0.18	0.00	-	-
	6,867	360,101	5.24	1,072	0.16	1,064	8	-	0.15	0.00	54,670	7.96
1990	7,019	293,093	4.18	1,275	0.18	1,243	32	-	0.18	0.00	13,788	1.96
	7,170	297,599	4.15	356	0.05	334	22	0	0.05	0.00	17,342	2.42
	7,321	343,491	4.69	377	0.05	367	10	0	0.05	0.00	8,429	1.15
1992 m)	7,471	299,549	4.01	698	0.09	694	4	0	0.09	0.00	226	0.03

- a) Estimated population, in thousands of inhabitants.
 b) Number thick blood films examined during the year.
 c) ABER = Annual Blood Examination Rate, per 100 inhabitants.
 d) Number of positive slides, i.e., showing Plasmodium in at least 100 microscopic fields.
 e) API = Annual Parasite Index, per 1000 inhabitants.
 f) Number of slides showing P. falciparum and other associated plasmodia.
 g) Number of slides showing P. vivax.
 h) Number of slides showing P. malariae and/or P. ovale.
 i) AFI = Annual P. falciparum Index during the year, per 1000 inhabitants.
 j) AVI = Annual P. vivax Index during the year, per 1000 inhabitants.
 k) Number of house sprayings during the year, regardless of cycles and insecticides.
 l) HSR = House spraying rate, per 1000 inhabitants.
 m) Information from "Pop. Division of the UN Secretariat, World Population Prospects. The 1992 Revision."

Sep/2/93

ECUADOR - Malarionetric Rates

1960-1992



ECUADOR - MALARIOMETRIC RATES

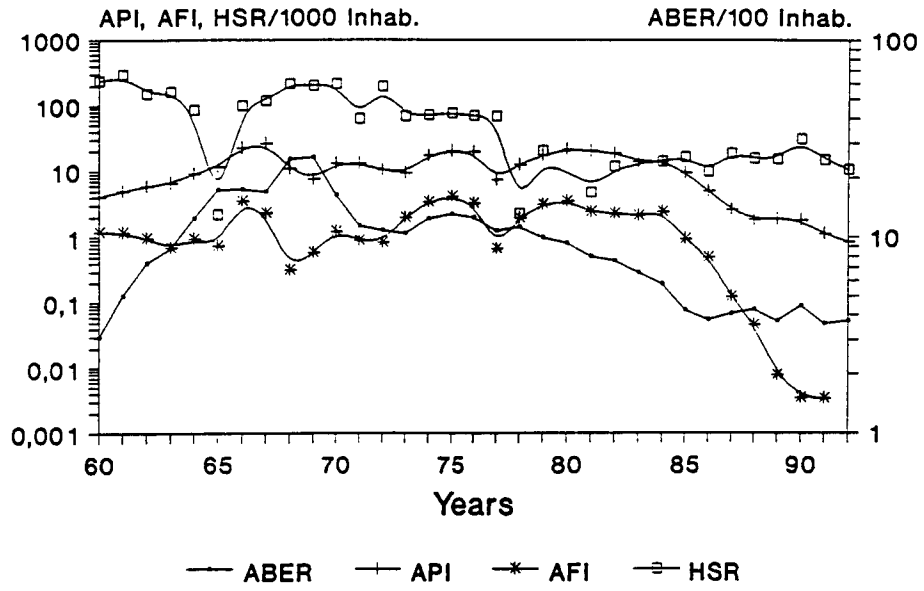
Year	Total population	Blood slides examined								Sprayings		
		Number	ABER	Positive	API	P. falc. & Assoc.		Other species	AFI	AVI	Number of sprayings	HSR
						P. vivax						
(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)	(j)	(k)	(l)	
1960	4,230	98,977	2.34	5,887	1.39	2,313	3,571	3	0.55	0.84	440,477	104.13
	4,358	119,562	2.74	9,084	2.08	3,158	5,906	20	0.72	1.36	349,331	80.16
	4,501	213,169	4.74	9,733	2.16	1,489	8,243	1	0.33	1.83	806,254	179.13
	4,655	269,004	5.78	5,531	1.19	658	4,868	5	0.14	1.05	856,598	184.02
	4,814	286,453	5.95	3,857	0.80	237	3,599	21	0.05	0.75	773,026	160.58
1965	4,979	314,700	6.32	4,628	0.93	264	4,363	1	0.05	0.88	720,136	144.63
	5,150	340,127	6.60	4,179	0.81	203	3,976	-	0.04	0.77	645,198	125.28
	5,326	311,821	5.85	4,976	0.93	406	4,570	-	0.08	0.86	194,823	36.58
	5,400	289,660	5.36	10,756	1.99	956	9,809	-	0.18	1.82	14,832	2.75
	5,580	350,183	6.28	37,043	6.64	4,196	32,835	12	0.75	5.88	307,305	55.07
1970	5,770	421,650	7.31	50,957	8.83	4,317	46,634	6	0.75	8.08	680,266	117.90
	5,960	360,879	6.06	28,375	4.76	2,828	25,539	8	0.47	4.29	745,376	125.06
	6,170	283,114	4.59	9,171	1.49	909	8,261	1	0.15	1.34	643,967	104.37
	6,380	321,611	5.04	6,707	1.05	727	5,982	-	0.11	0.94	611,398	95.83
	6,600	374,151	5.67	6,810	1.03	1,014	5,796	-	0.15	0.88	464,693	70.41
1975	6,830	314,685	4.61	5,481	0.80	1,003	4,470	8	0.15	0.65	366,261	53.63
	7,035	306,917	4.36	6,555	0.93	1,235	5,319	1	0.18	0.76	409,442	58.20
	7,242	313,053	4.32	10,974	1.52	1,945	9,020	9	0.27	1.25	267,971	37.00
	7,454	307,540	4.13	11,275	1.51	2,612	8,662	1	0.35	1.16	449,096	60.25
	7,671	303,139	3.95	9,815	1.28	2,205	7,609	1	0.29	0.99	416,546	54.30
1980	7,894	285,597	3.62	8,207	1.04	2,648	5,559	-	0.34	0.70	488,113	61.83
	8,123	367,129	4.52	8,748	1.08	2,755	5,993	-	0.34	0.74	222,997	27.45
	8,354	357,855	4.28	12,745	1.53	3,427	9,318	-	0.41	1.12	189,742	22.71
	8,590	384,792	4.48	14,633	1.70	3,126	11,507	-	0.36	1.34	30,206	3.52
	8,829	453,067	5.13	51,606	5.85	16,515	35,091	-	1.87	3.97	100,230	11.35
1985	9,072	408,465	4.50	78,599	8.66	15,637	62,962	-	1.72	6.94	266,068	29.33
	9,317	370,998	3.98	68,989	7.40	11,998	57,061	-	1.29	6.12	401,160	43.06
	9,565	275,865	2.88	51,430	5.38	11,985	39,445	-	1.25	4.12	57,253	5.99
	9,816	327,653	3.34	63,503	6.47	17,849	45,654	-	1.82	4.65	67,571	6.88
	10,070	333,918	3.32	53,607	5.32	13,561	40,046	-	1.35	3.98	234,233	23.26
1990	10,327	144,851	1.40	23,274	2.25	6,569	16,705	-	0.64	1.62	144,346	13.98
	10,587	363,080	3.43	71,670	6.77	21,871	49,799	-	2.07	4.70	204,252	19.29
(m)	10,800	346,465	3.21	59,400	5.50	13,868	45,532	0	1.28	4.22	290,500	26.90
1992 m)	11,055	377,321	3.41	41,089	3.72	15,970	25,119	0	1.44	2.27	196,315	17.76

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- a) Population in thousands, estimated by PAHO, Technical Information System.
 b) Number thick blood films examined during the year.
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 m) Information from "Pop. Division of the UN Secretariat, World Population Prospects. The 1992 Revision."

Sep/7/93

EL SALVADOR - Malarionetric Rates 1960-1992



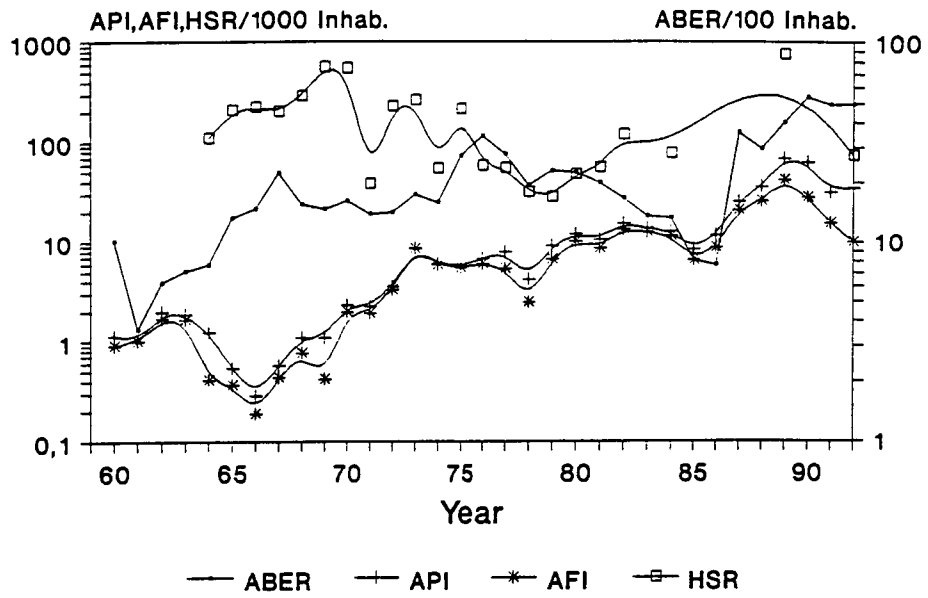
EL SALVADOR - MALARIOMETRIC RATES

Year	Total population	Blood slides examined							Sprayings			
		Number	ABER	Positive	API	P. falc. & Assoc.		Other species	AFI	AVI	Number of sprayings	HSR
						P. vivax						
(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)	(j)	(k)	(l)	
1960	2,386	71,259	2.99	17,521	7.34	4,051	13,430	-	1.70	5.63	556,360	233.18
	2,454	76,287	3.11	10,066	4.10	2,959	7,064	1	1.21	2.88	581,562	236.99
	2,527	127,293	5.04	12,563	4.97	2,960	9,594	4	1.17	3.80	749,266	296.50
	2,627	194,069	7.39	15,433	5.87	2,557	12,873	4	0.97	4.90	389,910	148.42
	2,721	238,791	8.78	17,846	6.56	1,879	15,962	5	0.69	5.87	436,369	160.37
1965	2,824	350,843	12.42	25,827	9.15	2,661	23,195	1	0.94	8.21	240,295	85.09
	2,928	506,442	17.30	34,070	11.64	2,186	31,884	-	0.75	10.89	6,393	2.18
	3,037	530,357	17.46	68,562	22.58	10,703	57,859	-	3.52	19.05	302,112	99.48
	3,151	535,494	16.99	82,960	26.33	7,227	75,734	-	2.29	24.03	372,167	118.11
	3,266	805,311	24.66	35,831	10.97	1,025	34,808	-	0.31	10.66	693,150	212.23
1970	3,390	858,916	25.34	25,299	7.46	1,994	23,344	-	0.59	6.89	681,157	200.93
	3,534	572,373	16.20	45,436	12.86	4,286	41,234	-	1.21	11.67	749,747	212.15
	3,647	414,331	11.36	46,858	12.85	3,235	43,623	1	0.89	11.96	227,668	62.43
	3,668	394,935	10.77	38,335	10.45	3,059	35,276	-	0.83	9.62	720,592	196.45
	3,771	393,110	10.42	35,095	9.31	7,286	27,809	-	1.93	7.37	258,027	68.42
1975	3,887	478,553	12.31	66,691	17.16	13,133	53,558	-	3.38	13.78	276,703	71.19
	4,143	538,909	13.01	83,100	20.06	16,816	66,284	-	4.06	16.00	319,126	77.03
	4,265	533,610	12.51	83,290	19.53	13,820	69,470	-	3.24	16.29	294,620	69.08
	4,392	471,109	10.73	32,243	7.34	2,934	29,300	-	0.67	6.67	302,401	68.85
	4,524	507,237	11.21	56,533	12.50	8,634	47,899	-	1.91	10.59	10,000	2.21
1980	4,388	434,475	9.90	75,657	17.24	13,391	62,266	-	3.05	14.19	88,092	20.08
	4,581	425,264	9.28	95,835	20.92	15,782	80,053	-	3.45	17.48	-	0.00
	4,625	367,447	7.94	93,187	20.15	10,878	82,309	-	2.35	17.80	21,600	4.67
	4,665	351,426	7.53	86,202	18.48	10,263	75,939	-	2.20	16.28	54,000	11.58
	4,665	306,648	6.57	65,377	14.01	9,696	55,681	-	2.08	11.94	-	0.00
1985	4,710	270,156	5.74	66,874	14.20	11,172	55,292	-	2.37	11.74	65,873	13.99
	4,768	201,177	4.22	44,473	9.33	4,373	40,100	-	0.92	8.41	77,497	16.25
	4,840	182,622	3.77	23,953	4.95	2,395	21,558	-	0.49	4.45	47,684	9.85
	4,927	200,654	4.07	12,834	2.60	598	12,236	-	0.12	2.48	90,766	18.42
	5,026	213,518	4.25	9,095	1.81	230	8,975	-	0.05	1.79	77,529	15.43
1990 m)	5,135	190,995	3.72	9,605	1.87	40	9,565	-	0.01	1.86	77,631	15.12
	5,172	230,246	4.45	9,269	1.79	18	9,251	-	0.00	1.79	159,108	30.76
	(m)	5,281	190,540	3.61	5,933	1.12	18	5,915	-	0.00	1.12	78,980	14.96
1992 m)	5,396	202,446	3.75	4,539	0.84	6	4,533	-	0.00	0.84	57,900	10.73

- a) Population in thousands, estimated by PAHO, Technical Information System.
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Ago/31/93

FRENCH GUIANA - Malarionetric Rates 1960-1992



FRENCH GUIANA - MALARIOMETRIC RATES

Year	Total population	Blood slides examined								Sprayings		
		Number	ABER	Positive	API	P. falc. & Assoc.	P. vivax	Other species	AFI	AVI	Number of sprayings	HSR
1960	33	3,343	10.13	37	1.12	30	6	1	0.91	0.18	-	-
	33	1,197	3.63	33	1.00	33	-	-	1.00	0.00	-	-
	35	2,183	6.24	70	2.00	60	10	-	1.71	0.29	-	-
	37	2,648	7.16	70	1.89	61	9	-	1.65	0.24	-	-
	39	3,025	7.76	48	1.23	16	32	-	0.41	0.82	4,298	110.21
1965	41	5,424	13.23	22	0.54	15	7	-	0.37	0.17	8,564	208.88
	42	6,180	14.71	12	0.29	8	4	-	0.19	0.10	9,432	224.57
	44	9,811	22.30	25	0.57	19	6	-	0.43	0.14	8,926	202.86
	46	7,132	15.50	50	1.09	35	14	1	0.76	0.30	13,464	292.70
	48	7,000	14.58	52	1.08	20	32	-	0.42	0.67	26,861	559.60
1970	51	8,237	16.15	117	2.29	101	16	-	1.98	0.31	27,967	548.37
	52	7,176	13.80	116	2.23	100	16	-	1.92	0.31	1,996	38.38
	54	7,597	14.07	192	3.56	178	14	-	3.30	0.26	12,361	228.91
	56	9,739	17.39	484	8.64	477	7	-	8.52	0.13	14,650	261.61
	58	9,153	15.78	351	6.05	343	8	-	5.91	0.14	3,160	54.48
1975	56	15,250	27.23	319	5.70	308	11	-	5.50	0.20	12,020	214.64
	58	19,854	34.23	394	6.79	354	40	-	6.10	0.69	3,400	58.62
	61	16,908	27.72	488	8.00	333	146	9	5.46	2.39	3,400	55.74
	63	12,147	19.28	266	4.22	156	102	8	2.48	1.62	2,000	31.75
	66	15,114	22.90	604	9.15	446	157	1	6.76	2.38	1,876	28.42
1980	69	15,462	22.41	831	12.04	700	131	-	10.14	1.90	3,315	48.04
	72	14,249	19.79	769	10.68	627	142	-	8.71	1.97	4,074	56.58
	74	12,319	16.65	1,143	15.45	997	145	1	13.47	1.96	8,925	120.61
	77	10,391	13.49	1,051	13.65	964	87	-	12.52	1.13	...	...
	80	10,587	13.23	1,021	12.76	919	102	-	11.49	1.28	6,240	78.00
1985	82	6,664	8.13	691	8.43	540	142	-	6.59	1.73	...	...
(*)	84	6,436	7.66	979	11.65	738	241	-	8.79	2.87	...	...
(*)	86	30,761	35.77	2,221	25.83	1,798	423	-	20.91	4.92	...	...
(*)	88	26,145	29.71	3,188	36.23	2,284	904	-	25.95	10.27	...	...
	90	35,993	39.99	6,284	69.82	3,831	2,391	-	42.57	26.57	68,000	755.56
1990	92	49,192	53.47	5,909	64.23	2,607	3,292	10	28.34	35.78	-	-
**	112	55242	49.32	3,573	31.90	1,745	1,663	71	15.58	14.85	-	-
1992 **	115	56925	49.50	4,072	35.41	2,796	1,161	125	24.31	10.10	8,600	74.78

a) Population in thousands, estimated by PAHO, Technical Information System.

Sep/7/93

b) Number thick blood films examined during the year.

c) ABER = Annual Blood Examination Rate, per 100 inhabitants.

d) Number of positive slides, i.e., showing Plasmodium in at least 100 microscopic fields.

e) API = Annual Parasite Index, per 1000 inhabitants.

f) Number of slides showing *P. falciparum* and other associated plasmodia.

g) Number of slides showing *P. vivax*.

h) Number of slides showing *P. malariae* and/or *P. ovale*.

i) AFI = Annual *P. falciparum* Index during the year, per 1000 inhabitants.

j) AVI = Annual *P. vivax* Index during the year, per 1000 inhabitants.

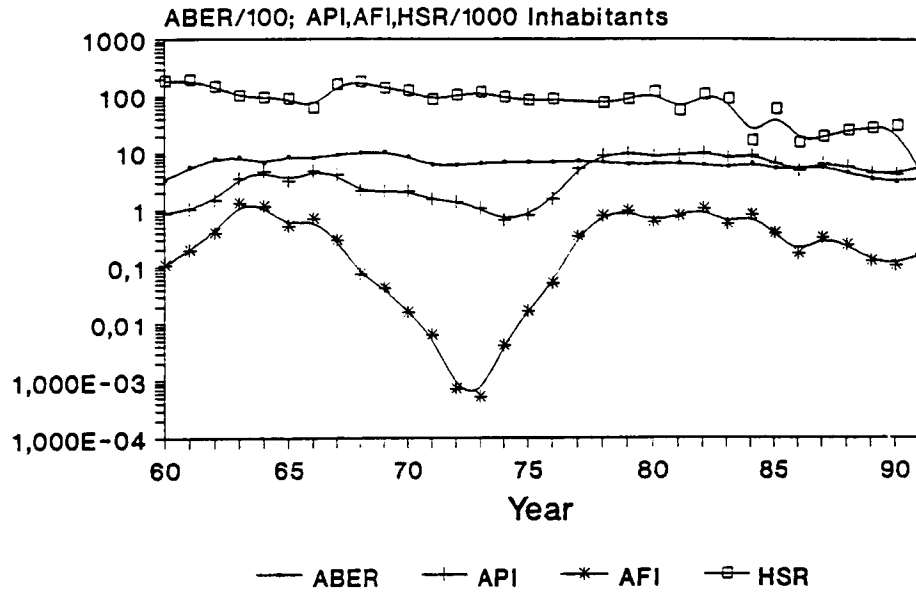
k) Number of house sprayings during the year, regardless of cycles and insecticides.

l) HSR = House spraying rate, per 1000 inhabitants.

m) Information from "Pop. Division of the UN Secretariat, World Population Prospects. The 1992 Revision."

* Information incomplete. ** Population figure estimated by country

GUATEMALA - Malaria Metrics Rates 1960-1991



GUATEMALA - MALARIOMETRIC RATES

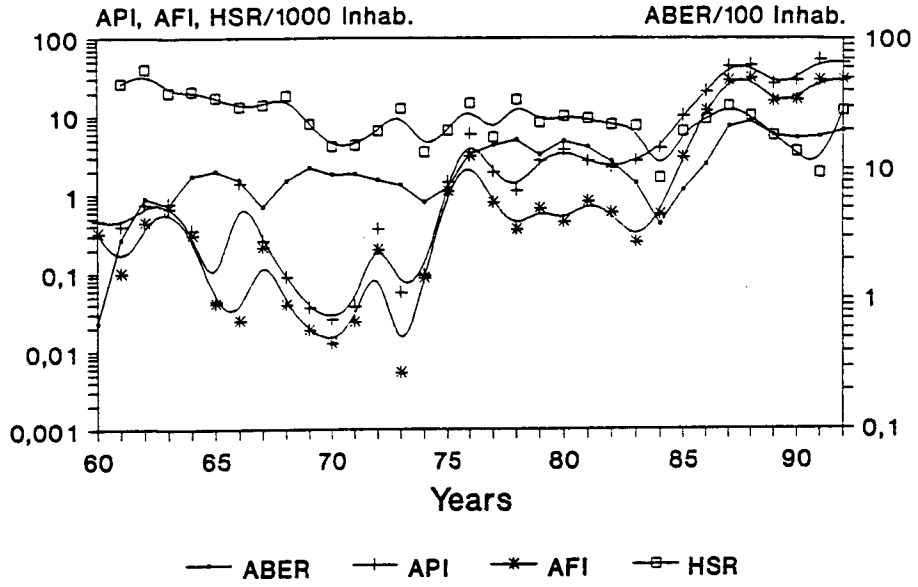
Year	Total population	Blood slides examined								Sprayings		
		Number	ABER	Positive	API	P. falc. & Assoc.		Other species	AFI	AVI	Number of sprayings	HSR
						P. vivax						
(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)	(j)	(k)	(l)	
1960	3,695	108,047	2.92	7,894	2.14	1,548	6,346	-	0.42	1.72	631,998	171.04
	3,810	129,742	3.41	3,387	0.89	417	2,969	1	0.11	0.78	697,557	183.09
	3,928	218,628	5.57	4,083	1.04	780	3,298	5	0.20	0.84	756,185	192.51
	4,051	323,373	7.98	5,996	1.48	1,601	4,375	20	0.40	1.08	606,853	149.80
	4,185	348,866	8.34	15,116	3.61	5,557	9,522	37	1.33	2.28	427,022	102.04
1965	4,305	289,058	6.71	20,401	4.74	5,003	15,358	40	1.16	3.57	411,234	95.52
	4,438	380,562	8.58	14,472	3.26	2,313	12,157	2	0.52	2.74	393,924	88.76
	4,565	376,439	8.25	22,045	4.83	3,230	18,812	3	0.71	4.12	278,804	61.07
	4,698	439,186	9.35	19,684	4.19	1,377	18,306	1	0.29	3.90	752,620	160.20
	4,837	492,940	10.19	10,407	2.15	364	10,043	-	0.08	2.08	858,960	177.58
1970	4,966	521,336	10.50	10,494	2.11	209	10,284	1	0.04	2.07	687,708	138.48
	5,270	449,706	8.53	11,044	2.10	83	10,961	-	0.02	2.08	648,392	123.03
	5,420	332,531	6.14	8,280	1.53	34	8,245	1	0.01	1.52	476,143	87.85
	5,580	345,156	6.19	7,750	1.39	4	7,746	-	0.00	1.39	584,258	104.71
	5,740	386,026	6.73	6,182	1.08	3	6,179	-	0.00	1.08	674,310	117.48
1975	6,050	421,240	6.96	4,030	0.67	25	4,005	-	0.00	0.66	583,575	96.46
	6,023	418,749	6.95	4,979	0.83	100	4,879	-	0.02	0.81	518,531	86.09
	6,191	435,097	7.03	9,616	1.55	320	9,296	-	0.05	1.50	557,844	90.11
	6,364	472,297	7.42	34,907	5.49	2,159	32,748	-	0.34	5.15	0	0.00
	6,543	463,794	7.09	59,755	9.13	5,234	54,521	-	0.80	8.33	504,664	77.13
1980	6,727	440,712	6.55	69,039	10.26	6,631	62,408	-	0.99	9.28	605,403	90.00
	6,917	456,784	6.60	62,657	9.06	4,361	58,296	-	0.63	8.43	840,518	121.51
	7,113	475,777	6.69	67,994	9.56	5,718	62,276	-	0.80	8.76	407,716	57.32
	7,315	468,430	6.40	77,375	10.58	7,841	69,534	-	1.07	9.51	805,968	110.18
	7,524	442,745	5.88	64,024	8.51	4,356	59,668	-	0.58	7.93	695,933	92.50
1985	7,740	526,694	6.80	74,132	9.58	6,535	67,597	-	0.84	8.73	132,682	17.14
	7,963	441,757	5.55	54,958	6.90	3,125	51,833	-	0.39	6.51	494,653	62.12
	8,195	453,401	5.53	42,609	5.20	1,425	41,184	-	0.17	5.03	129,627	15.82
	8,434	511,445	6.06	57,662	6.84	2,804	54,858	-	0.33	6.50	175,161	20.77
	8,681	413,216	4.76	52,561	6.05	2,165	50,396	-	0.25	5.81	231,676	26.69
1990	8,935	331,675	3.71	42,453	4.75	1,155	41,298	-	0.13	4.62	260,681	29.18
	9,197	305,791	3.32	41,711	4.54	1,008	40,703	-	0.11	4.43	297,471	32.34
	9,467	361,743	3.82	57,829	6.11	1,616	56,070	-	0.17	5.92	42,206	4.46
1992 m	9,745	396,171	4.07	57,560	5.91	1,480	56,080	-	0.15	5.75	16,905	1.73

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- a) Population in thousands, estimated by PAHO, Technical Information System. Sept/2/93
 b) Number thick blood films examined during the year.
 c) ABER = Annual Blood Examination Rate, per 100 inhabitants.
 d) Number of positive slides, i.e. showing Plasmodium in at least 100 microscopic fields.
 e) API = Annual Parasite Index, per 1000 inhabitants.
 f) Number of slides showing P. falciparum and other associated plasmodia.
 g) Number of slides showing P. vivax.
 h) Number of slides showing P. malariae and/or P. ovale.
 i) AFI = Annual P. falciparum Index during the year, per 1000 inhabitants.
 j) AVI = Annual P. vivax Index during the year, per 1000 inhabitants.
 k) Number of house sprayings during the year, regardless of cycles and insecticides.
 l) HSR = House spraying rate, per 1000 inhabitants.
 m) Information from "Pop. Division of the UN Secretariat, World Population Prospects. The 1992 Revision."

GUYANA - Malarionetric Rates

1960-1992



GUYANA - MALARIOMETRIC RATES

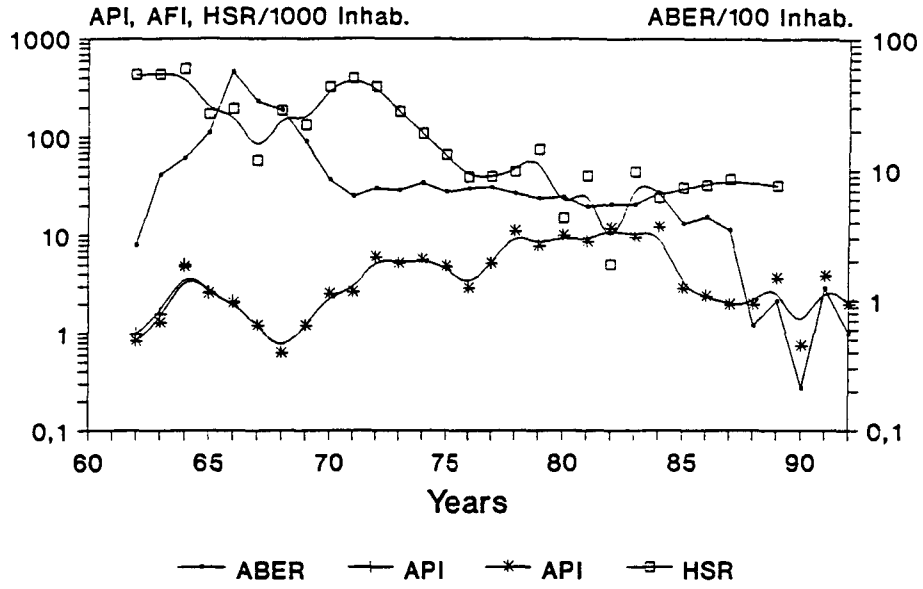
	Total Year population (a)	Blood slides examined							Sprayings			
		Number	ABER	Positive	API	P. falc. & Assoc. P. vivax	Other species	AFI	AVI	Number of sprayings	HSR	
		(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)	(j)	(k)	(l)
1960	550	3,754	0.68	176	0.32	63	100	13	0.11	0.18	...	...
	565	3,674	0.65	263	0.47	184	67	12	0.33	0.12	...	...
	585	16,889	2.89	231	0.39	58	168	5	0.10	0.29	15,107	25.82
	600	35,446	5.91	446	0.74	266	180	-	0.44	0.30	23,808	39.68
	617	32,255	5.23	476	0.77	418	58	-	0.68	0.09	12,231	19.82
1965	630	55,185	8.76	225	0.36	192	33	-	0.30	0.05	13,072	20.75
	643	61,507	9.57	28	0.04	26	2	-	0.04	0.00	11,121	17.30
	659	53,669	8.14	910	1.38	16	894	-	0.02	1.36	8,618	13.08
	674	34,163	5.07	175	0.26	145	29	1	0.22	0.04	9,242	13.71
	686	55,217	8.05	61	0.09	27	34	-	0.04	0.05	12,508	18.23
1970	694	70,121	10.10	25	0.04	13	12	-	0.02	0.02	5,477	7.89
	710	63,623	8.96	18	0.03	9	9	-	0.01	0.01	2,883	4.06
	725	66,967	9.10	27	0.04	17	9	1	0.02	0.01	3,049	4.21
	741	59,931	8.09	266	0.36	147	119	-	0.20	0.16	4,770	6.44
	758	56,420	7.44	42	0.06	4	38	-	0.01	0.05	9,343	12.33
1975	774	42,549	5.50	72	0.09	67	5	-	0.09	0.01	2,676	3.46
	780	55,758	7.15	1,116	1.43	854	262	-	1.09	0.34	5,137	6.59
	796	102,815	12.92	4,642	5.83	2,456	2,186	-	3.09	2.75	11,479	14.42
	812	121,075	14.91	1,563	1.92	640	923	-	0.79	1.14	4,364	5.37
	830	137,114	16.52	927	1.12	293	633	1	0.35	0.76	13,578	16.36
1980	847	107,232	12.66	2,294	2.71	564	1,730	-	0.67	2.04	6,974	8.23
	865	139,433	16.12	3,202	3.70	380	2,822	-	0.44	3.26	8,602	9.94
	766	110,993	14.49	2,065	2.70	620	1,443	2	0.81	1.88	7,025	9.17
	773	87,525	11.32	1,700	2.20	451	1,249	-	0.58	1.62	5,905	7.64
	780	59,940	7.68	2,102	2.69	188	1,912	2	0.24	2.45	5,777	7.41
1985	786	29,207	3.72	3,017	3.84	431	2,585	1	0.55	3.29	1,257	1.60
	790	53,276	6.74	7,900	10.00	2,336	5,564	-	2.96	7.04	4,982	6.31
	792	84,763	10.70	16,388	20.69	9,336	7,052	-	11.79	0.08	7,179	9.06
	793	165,230	20.84	34,142	43.05	22,638	11,504	-	28.55	0.07	10,668	13.45
	793	181,067	22.83	35,470	44.73	24,327	11,143	-	30.68	0.06	7,965	10.04
	794	143,599	18.09	20,822	26.22	12,390	8,432	-	15.60	0.06	4,490	5.65
1990	796	135,260	16.99	22,681	28.49	12,907	9,777	-	16.21	0.07	2,793	3.51
(m)	800	141,046	17.63	42,204	52.76	23,397	18,807	-	29.25	0.13	1,502	1.88
1991m)	808	159,108	19.69	39,702	49.14	23,871	15,831	-	29.54	0.10	9,665	11.96

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- a) Population in thousands, estimated by PAHO, Technical Information System. Sep/7/93
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- d) Number of positive slides, i.e., showing Plasmodium in at least 100 microscopic fields.
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- f) Number of slides showing P. falciparum and other associated plasmodia.
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- i) AFI = Annual P. falciparum Index during the year, per 1000 inhabitants.
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- k) Number of house sprayings during the year, regardless of cycles and insecticides.
- l) HSR = House spraying rate, per 1000 inhabitants.
- m) Information from "Pop. Division of the UN Secretariat, World Population Prospects. The 1992 Revision."

HAITI - Malaria Metrics Rates

1962-1992



HAITI - MALARIOMETRIC RATES

Year	Total Year population	Blood slides examined							Sprayings			
		Number	ABER	Positive	API	P. falc. & Assoc.	P. vivax	Other species	AFI	AVI	Number of sprayings	HSR
		(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)	(j)	(k)	(l)
1960	3,991	...	...	...	...	...	...	...	...	...	...	...
	4,067	...	...	...	...	...	...	...	...	...	...	...
	4,145	111,142	2.68	4,033	0.97	3,441	20	572	0.83	0.00	1,792,395	432.42
	4,226	386,657	9.15	6,662	1.58	5,464	12	1,186	1.29	0.00	1,817,027	429.96
	3,850	473,297	12.29	19,170	4.98	18,422	24	724	4.78	0.01	1,883,520	489.23
1965	3,910	752,284	19.24	10,304	2.64	9,997	20	287	2.56	0.01	664,572	169.97
	3,970	2,239,469	56.41	8,378	2.11	8,208	35	138	2.07	0.01	772,513	194.69
	4,030	1,343,796	33.34	4,871	1.21	4,840	3	28	1.20	0.00	233,513	57.94
	4,100	1,173,905	28.63	2,562	0.62	2,556	3	3	0.62	0.00	760,385	185.46
	4,160	686,167	16.49	5,005	1.20	4,999	1	5	1.20	0.00	549,869	132.18
1970	4,235	357,366	8.44	10,658	2.52	10,654	-	4	2.52	-	1,354,700	319.88
	4,315	270,695	6.27	11,347	2.63	11,345	2	-	2.63	0.00	1,697,187	393.32
	4,368	313,368	7.17	25,961	5.94	25,961	-	-	5.94	-	1,411,027	323.04
	4,440	309,482	6.97	22,858	5.15	22,857	-	1	5.15	-	801,247	180.46
	4,514	357,546	7.92	25,441	5.64	25,441	-	-	5.64	-	487,658	108.03
1975	5,157	346,934	6.73	24,733	4.80	24,732	1	-	4.80	-	337,874	65.52
	5,279	380,184	7.20	15,087	2.86	15,078	7	2	2.86	0.00	205,767	38.98
	5,405	400,024	7.40	27,679	5.12	27,646	28	5	5.11	0.01	213,796	39.56
	5,535	365,202	6.60	60,472	10.93	60,471	1	-	10.93	0.00	247,095	44.64
	5,295	321,456	6.07	41,252	7.79	41,252	-	-	7.79	-	396,595	74.90
1980	5,413	333,157	6.15	53,478	9.88	53,478	-	-	9.88	-	80,244	14.82
	5,466	283,978	5.20	46,703	8.54	46,703	-	-	8.54	-	219,512	40.16
	5,566	303,118	5.45	65,354	11.74	65,354	-	-	11.74	-	27,683	4.97
	5,669	308,075	5.43	53,954	9.52	53,954	-	-	9.52	-	253,177	44.66
	5,777	385,400	6.67	69,863	12.09	69,862	1	-	12.09	0.00	138,174	23.92
1985	5,889	226,887	3.85	16,662	2.83	16,662	-	-	2.83	-	179,230	30.43
	6,006	262,582	4.37	14,363	2.39	14,363	-	-	2.39	-	194,512	32.39
	6,127	212,989	3.48	12,134	1.98	12,120	14	-	1.98	0.00	227,813	37.18
(*)	6,252	40,321	0.64	12,306	1.97	12,306	-	-	1.97	0.00	0	0.00
	6,381	63,528	1.00	23,231	3.64	23,231	-	-	3.64	0.00	206,541	32.37
1990 m	6,513	13,743	0.21	4,806	0.74	4,806	-	-	0.74	0.00	0	0.00
(m)	6,647	81,763	1.23	25,511	3.84	25,511	-	-	3.84	0.00	0	0.00
1992 m, n	6,577	37,957	0.58	13,457	2.05	13,457	-	-	2.05	0.00	0	0.00

a) Population in thousands, estimated by PAHO, Technical Information System.

b) Number thick blood films examined during the year.

c) ABER = Annual Blood Examination Rate, per 100 inhabitants.

d) Number of positive slides, i.e. showing Plasmodium in at least 100 microscopic fields.

e) API = Annual Parasite Index, per 1000 inhabitants.

f) Number of slides showing *P. falciparum* and other associated plasmodia.

g) Number of slides showing *P. vivax*.

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i) AFI = Annual *P. falciparum* Index during the year, per 1000 inhabitants.

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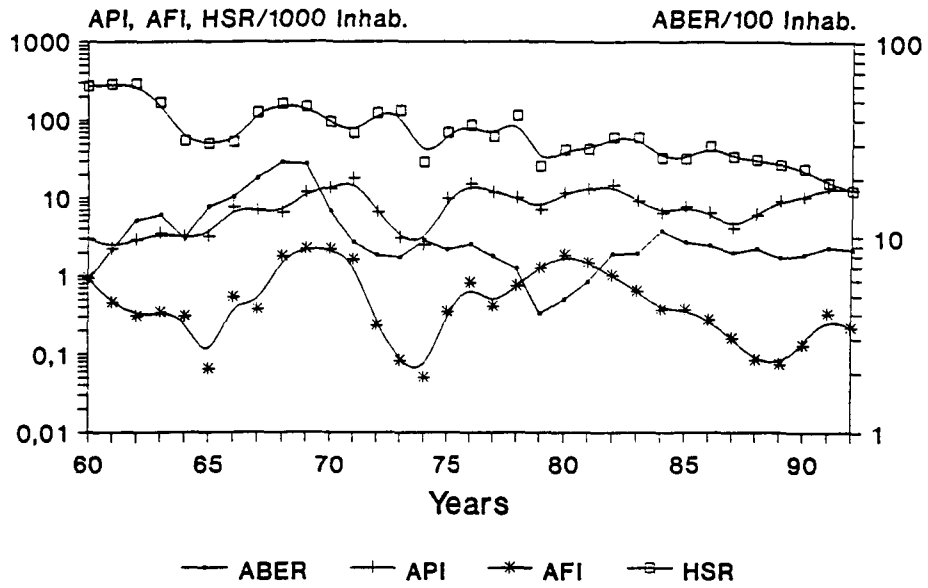
l) HSR = House spraying rate, per 1000 inhab* Provisional information for 1988.

m) Information from "Pop. Division of the UN Secretariat, World Population Prospects. The 1992 Revision."

n) Information up to June.

Sep/7/93

HONDURAS - Malarionetric Rates 1960-1992



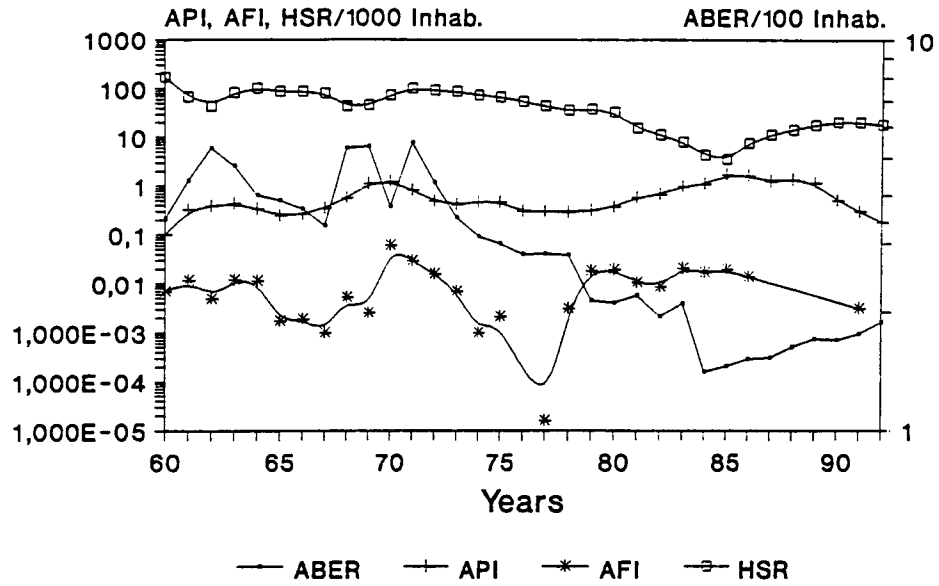
HONDURAS - MALARIOMETRIC RATES

Year	Total population	Blood slides examined							Sprayings			
		Number	ABER	Positive	API	P. falc. & Assoc.		Other species	AFI	AVI	Number of sprayings	HSR
						P. vivax						
(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)	(j)	(k)	(l)	
1960	1,880	66,391	3.53	6,675	3.55	3,170	3,504	1	1.69	1.86	236,963	126.04
	1,849	109,677	5.93	5,517	2.98	1,737	3,780	-	0.94	2.04	496,758	268.66
	1,910	164,965	8.64	4,334	2.27	861	3,472	1	0.45	1.82	543,766	284.69
	1,973	239,655	12.15	5,750	2.91	597	5,153	-	0.30	2.61	575,450	291.66
	2,040	264,131	12.95	7,077	3.47	688	6,389	-	0.34	3.13	336,144	164.78
1965	2,109	207,000	9.82	6,673	3.16	641	6,032	-	0.30	2.86	115,153	54.60
	2,181	310,301	14.23	6,952	3.19	141	6,811	-	0.06	3.12	109,162	50.05
	2,256	360,760	15.99	17,127	7.59	1,204	15,923	-	0.53	7.06	118,142	52.37
	2,333	465,598	19.96	16,144	6.92	872	15,272	-	0.37	6.55	288,253	123.55
	2,413	584,696	24.23	15,666	6.49	4,281	11,385	-	1.77	4.72	382,068	158.34
1970	2,495	591,544	23.71	29,584	11.86	5,528	24,056	-	2.22	9.64	360,416	144.46
	2,640	357,436	13.54	34,537	13.08	5,875	28,662	-	2.23	10.86	248,440	94.11
	2,720	255,773	9.40	48,586	17.86	4,444	44,142	-	1.63	16.23	184,027	67.66
	2,810	226,578	8.06	18,651	6.64	652	17,999	-	0.23	6.41	340,011	121.00
	2,900	226,231	7.80	8,862	3.06	239	8,621	2	0.08	2.97	376,655	129.88
1975	2,990	287,842	9.63	7,503	2.51	150	7,353	-	0.05	2.46	86,626	28.97
	3,093	266,923	8.63	30,289	9.79	1,078	29,210	1	0.35	9.44	213,792	69.12
	3,202	295,128	9.22	48,804	15.24	2,603	46,201	-	0.81	14.43	276,375	86.31
	3,318	264,233	7.96	39,414	11.88	1,355	38,059	-	0.41	11.47	202,920	61.16
	3,438	236,650	6.88	34,554	10.05	2,539	32,013	2	0.74	9.31	389,642	113.33
1980	3,563	143,485	4.03	25,297	7.10	4,505	20,792	-	1.26	5.84	90,500	25.40
	3,691	175,591	4.76	43,009	11.65	6,789	36,220	-	1.84	9.81	154,362	41.82
	3,798	221,822	5.84	49,377	13.00	5,667	43,710	-	1.49	11.51	160,536	42.27
	3,939	322,802	8.20	57,482	14.59	4,019	53,463	-	1.02	13.57	233,702	59.33
	4,086	336,879	8.24	37,536	9.19	2,640	34,896	-	0.65	8.54	243,669	59.64
1985	4,234	452,184	10.68	27,332	6.46	1,589	25,743	-	0.38	6.08	138,174	32.63
	4,383	410,720	9.37	33,828	7.72	1,616	32,212	-	0.37	7.35	140,793	32.12
	4,531	411,150	9.07	29,130	6.43	1,238	27,892	-	0.27	6.16	211,214	46.62
	4,680	388,509	8.30	19,095	4.08	743	18,352	-	0.16	3.92	158,386	33.84
	4,830	421,474	8.73	29,737	6.16	405	29,332	-	0.08	6.07	148,736	30.79
*	4,982	391,250	7.85	45,922	9.22	367	45,555	-	0.07	9.14	134,593	27.02
1990	5,138	418,513	8.15	53,095	10.33	659	52,436	-	0.13	10.21	123,963	24.13
1991	5,298	468,811	8.85	73,352	13.85	1,731	71,621	-	0.33	13.52	83,217	15.71
1991	5,298	468,811	8.85	73,352	13.85	1,731	71,621	-	0.33	13.52	83,217	15.71

- a) Population in thousands, estimated by PAHO, Technical Information System. Sep/7/93
b) Number thick blood films examined during the year.
c) ABER = Annual Blood Examination Rate, per 100 inhabitants.
d) Number of positive slides, i.e., showing Plasmodium in at least 100 microscopic fields.
e) API = Annual Parasite Index, per 1000 inhabitants.
f) Number of slides showing *P. falciparum* and other associated plasmodia.
g) Number of slides showing *P. vivax*.
h) Number of slides showing *P. malariae* and/or *P. ovale*.
i) AFI = Annual *P. falciparum* Index during the year, per 1000 inhabitants.
j) AVI = Annual *P. vivax* Index during the year, per 1000 inhabitants.
k) Number of house sprayings during the year, regardless of cycles and insecticides.
l) HSR = House spraying rate, per 1000 inhabitants.
m) Information from "Pop. Division of the UN Secretariat, World Population Prospects. The 1992 Revision."
* Provisional information.

MEXICO - Malarionetric Rates

1960-1992



MEXICO - MALARIOMETRIC RATES

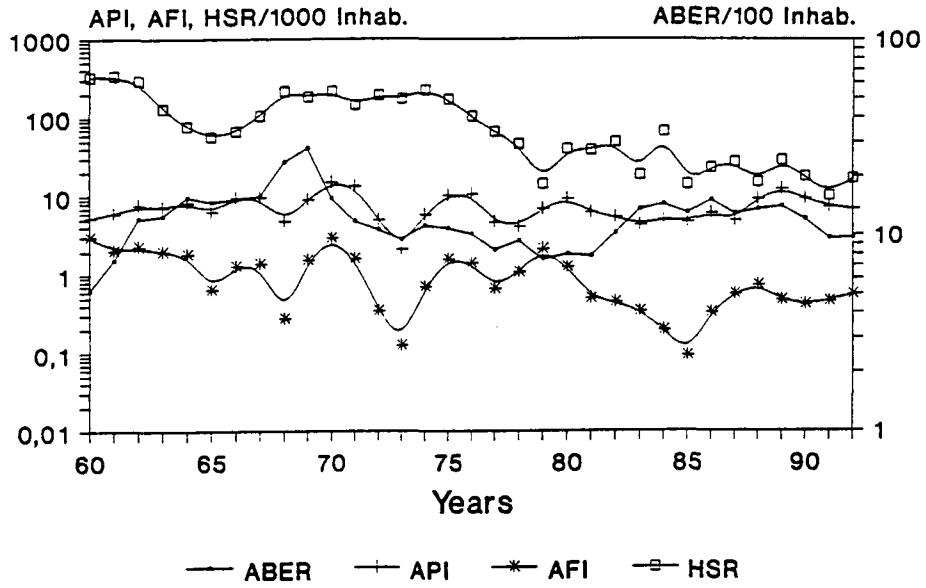
Year	Total population	Blood slides examined							Sprayings			
		Number	ABER	Positive	API	P. falc. & Assoc		Other species	AFI	AVI	Number of sprayings	HSR
						P. vivax						
(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)	(j)	(k)	(l)	
1960	34,851	821,598	2.36	3,202	0.09	443	2,705	54	0.01	0.08	6,560,183	188.24
	34,994	1,212,770	3.47	3,569	0.10	245	3,251	73	0.01	0.09	5,918,572	169.13
	36,158	1,574,267	4.35	11,849	0.33	428	11,287	134	0.01	0.31	2,434,790	67.34
	37,367	1,967,392	5.27	14,279	0.38	182	14,027	70	0.00	0.38	1,608,147	43.04
	38,623	1,832,551	4.74	16,741	0.43	462	16,215	64	0.01	0.42	3,182,640	82.40
	39,928	1,595,323	4.00	13,405	0.34	454	12,929	22	0.01	0.32	4,068,291	101.89
1965	41,284	1,595,503	3.86	10,113	0.24	70	10,033	10	0.00	0.24	3,580,140	86.72
	42,694	1,572,042	3.68	11,212	0.26	80	11,121	11	0.00	0.26	3,714,522	87.00
	44,161	1,471,843	3.33	15,163	0.34	44	15,110	9	0.00	0.34	3,515,375	79.60
	45,686	2,406,837	5.27	26,040	0.57	236	25,669	135	0.01	0.56	1,973,112	43.19
	47,274	2,524,060	5.34	52,126	1.10	119	51,958	119	0.00	1.10	2,136,772	45.20
1970	50,695	1,889,877	3.73	61,158	1.21	3,026	58,083	49	0.06	1.15	3,666,055	72.32
	52,452	2,859,253	5.45	42,978	0.82	1,501	41,432	45	0.03	0.79	5,350,655	102.01
	54,273	2,329,667	4.29	26,216	0.48	852	25,324	40	0.02	0.47	4,965,198	91.49
	56,161	1,959,139	3.49	23,176	0.41	393	22,760	23	0.01	0.41	4,836,154	86.11
	58,118	1,822,307	3.14	26,800	0.46	57	26,718	25	0.00	0.46	4,293,265	73.87
1975	60,153	1,805,782	3.00	27,925	0.46	126	27,784	15	0.00	0.46	4,053,426	67.39
	61,990	1,749,778	2.82	18,153	0.29	-	18,139	14	0.00	0.29	3,397,260	54.80
	63,827	1,804,367	2.83	18,851	0.30	1	18,842	8	0.00	0.30	2,817,470	44.14
	65,668	1,845,554	2.81	19,080	0.29	200	18,865	15	0.00	0.29	2,354,162	35.85
	67,522	1,446,946	2.14	20,983	0.31	1,208	19,760	15	0.02	0.29	2,609,171	38.64
1980	69,393	1,467,695	2.12	25,734	0.37	1,329	24,402	3	0.02	0.35	2,298,366	33.12
	72,162	1,593,697	2.21	42,104	0.58	762	41,336	6	0.01	0.57	1,141,083	15.81
	73,938	1,440,806	1.95	49,993	0.68	637	49,242	114	0.01	0.67	828,311	11.20
	75,739	1,595,180	2.11	75,029	0.99	1,554	73,472	3	0.02	0.97	613,268	8.10
	77,554	1,093,953	1.41	85,501	1.10	1,283	84,214	4	0.02	1.09	338,538	4.37
1985	79,376	1,156,831	1.46	133,698	1.68	1,537	132,160	1	0.02	1.66	276,785	3.49
	81,204	1,237,260	1.52	131,014	1.61	1,105	129,909	-	0.01	1.60	612,395	7.54
	83,040	1,275,010	1.54	102,984	1.24	332	102,651	1	0.00	1.24	927,461	11.17
(*)	84,884	1,385,626	1.63	116,238	1.37	152	116,086	-	0.00	1.37	1,219,319	14.36
**	86,737	1,484,565	1.71	101,241	1.17	85	101,127	-	0.00	1.17	1,583,090	18.25
1990	88,598	1,503,208	1.70	44,513	0.50	62	44,451	-	0.00	0.50	1,857,765	20.97
	90,467	1,596,427	1.76	26,565	0.29	278	26,287	-	0.00	0.29	1,887,062	20.86
1992m)	90,467	1,596,427	1.76	26,565	0.29	278	26,287	-	0.00	0.29	1,887,062	20.86

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- a) Population in thousands, estimated by PAHO, Technical Information System. Sep/7/93
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d) Number of positive slides, i.e., showing Plasmodium in at least 100 microscopic fields.
e) API = Annual Parasite Index, per 1000 inhabitants.
f) Number of slides showing P. falciparum and other associated plasmodia.
g) Number of slides showing P. vivax.
h) Number of slides showing P. malariae and/or P. ovale.
i) AFI = Annual P. falciparum Index during the year, per 1000 inhabitants.
j) AVI = Annual P. vivax Index during the year, per 1000 inhabitants.
k) Number of house sprayings during the year, regardless of cycles and insecticides.
l) HSR = House spraying rate, per 1000 inhabitants.
m) Information from "Pop. Division of the UN Secretariat, World Population Prospects. The 1992 Revision."
* Provisional information. ** In 1989, 28 cases without diagnostic specie are included.

NICARAGUA - Malarionetric Rates

1960-1992



NICARAGUA - MALARIOMETRI RATES

Year	Total population	Blood slides examined							Sprayings			
		Number	ABER	Positive	API	P. falc. & Assoc.	P. vivax	Other species	AFI	AVI	Number of sprayings	HSR
		(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)	(j)	(k)	(l)
1960	1,370	38,965	2.84	1,907	1.39	649	1,258	-	0.47	0.92	425,575	310.64
	1,411	74,074	5.25	7,528	5.34	4,217	3,311	-	2.99	2.35	460,554	326.40
	1,453	109,283	7.52	8,722	6.00	3,001	5,721	-	2.07	3.94	490,912	337.86
	1,496	181,727	12.15	11,359	7.59	3,454	7,904	1	2.31	5.28	435,155	290.88
	1,541	194,087	12.59	11,155	7.24	3,034	8,121	-	1.97	5.27	197,715	128.30
1965	1,579	247,611	15.68	13,016	8.24	2,908	10,108	-	1.84	6.40	122,046	77.29
	1,619	238,467	14.73	10,275	6.35	1,039	9,236	-	0.64	5.70	91,614	56.59
	1,660	254,497	15.33	15,647	9.43	2,128	13,519	-	1.28	8.14	109,931	66.22
	1,701	269,395	15.84	16,321	9.59	2,353	13,968	-	1.38	8.21	177,422	104.30
	1,744	411,544	23.60	8,250	4.73	479	7,771	-	0.27	4.46	374,418	214.69
1970	1,788	498,119	27.86	16,050	8.98	2,732	13,318	-	1.53	7.45	322,777	180.52
	1,833	281,386	15.35	27,260	14.87	5,348	21,912	-	2.92	11.95	390,083	212.81
	1,889	223,098	11.81	25,303	13.39	3,041	22,262	-	1.61	11.79	269,794	142.82
	1,954	208,232	10.66	9,595	4.91	666	8,929	-	0.34	4.57	376,056	192.45
	2,015	191,361	9.50	4,246	2.11	251	3,989	6	0.12	1.98	348,622	173.01
1975	2,084	233,941	11.23	12,167	5.84	1,452	10,715	-	0.70	5.14	463,391	222.36
	2,408	259,675	10.78	24,692	10.25	3,798	20,894	-	1.58	8.68	408,839	169.78
	2,478	250,582	10.11	26,228	10.58	3,513	22,715	-	1.42	9.17	253,158	102.16
	2,546	215,093	8.45	11,584	4.55	1,671	9,913	-	0.66	3.89	167,367	65.74
	2,616	243,450	9.31	10,633	4.06	2,798	7,835	-	1.07	3.00	118,468	45.29
1980	2,690	203,475	7.56	18,418	6.85	5,669	12,749	-	2.11	4.74	37,887	14.08
	2,771	222,427	8.03	25,465	9.19	3,424	22,041	-	1.24	7.95	108,157	39.03
	2,859	223,473	7.82	17,434	6.10	1,396	16,038	-	0.49	5.61	107,362	37.55
	2,955	300,001	10.15	15,601	5.28	1,291	14,310	-	0.44	4.84	142,931	48.37
	3,056	412,858	13.51	12,907	4.22	1,018	11,889	-	0.33	3.89	56,271	18.41
1985	3,162	451,943	14.29	15,702	4.97	615	15,087	-	0.19	4.77	205,494	64.99
	3,272	424,681	12.98	15,130	4.62	298	14,840	-	0.09	0.03	45,356	13.86
	3,385	510,289	15.08	20,308	6.00	1,096	19,212	-	0.32	0.04	77,423	22.87
	3,502	448,314	12.80	17,011	4.86	1,928	15,083	-	0.55	0.03	93,573	26.72
	3,622	490,145	13.53	33,047	9.12	2,575	30,472	-	0.71	0.06	54,267	14.98
1990	3,745	523,700	13.98	45,982	12.28	1,720	44,262	-	0.46	0.08	105,454	28.16
	3,871	465,830	12.03	35,785	9.24	1,568	34,217	-	0.41	0.07	68,348	17.66
	3,807	364,786	9.58	27,653	7.26	1,702	25,951	-	0.45	0.07	37,836	9.94
1992	3,955	381,715	9.65	26,866	6.79	2,192	24,674	-	0.55	0.06	65,400	16.54

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a) Population in thousands, estimated by PAHO, Technical Information System.

Sep/2/93

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d) Number of positive slides, i.e., showing Plasmodium in at least 100 microscopic fields.

e) API = Annual Parasite Index, per 1000 inhabitants.

f) Number of slides showing *P. falciparum* and other associated plasmodia.

g) Number of slides showing *P. vivax*.

h) Number of slides showing *P. malariae* and/or *P. ovale*.

i) AFI = Annual *P. falciparum* Index during the year, per 1000 inhabitants.

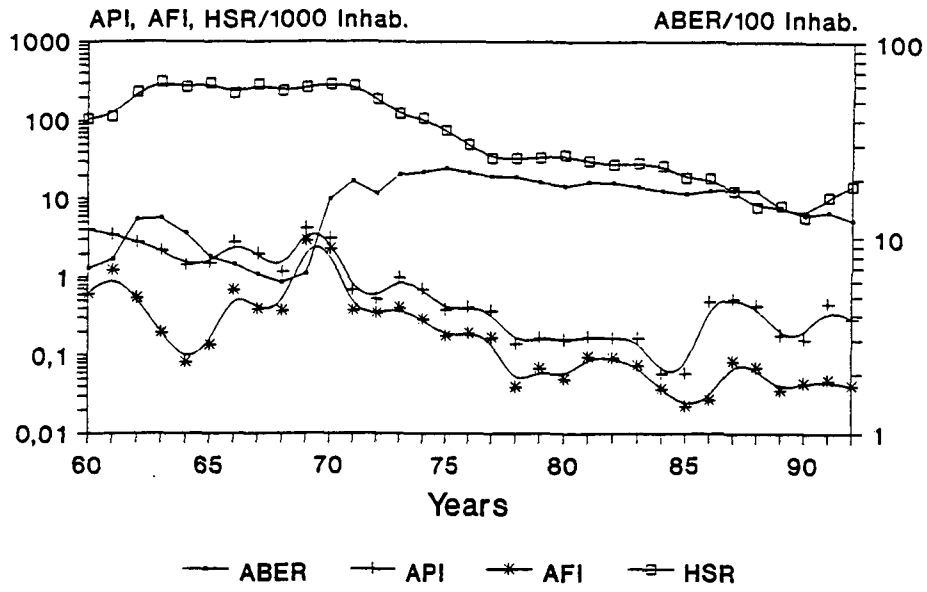
j) AVI = Annual *P. vivax* Index during the year, per 1000 inhabitants.

k) Number of house sprayings during the year, regardless of cycles and insecticides.

l) HSR = House spraying rate, per 1000 inhabitants.

m) Information from "Pop. Division of the UN Secretariat, World Population Prospects, The 1992 Revision."

PANAMA - Malaria Metrics Rates 1960-1992



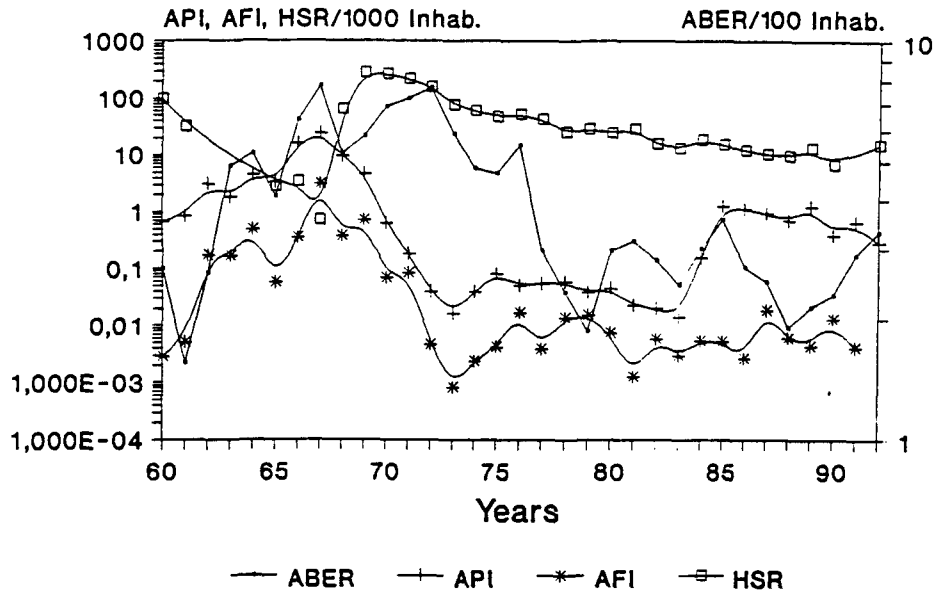
PANAMA - MARIOMETRIC RATES

Year	Total population	Blood slides examined								Sprayings		
		Number	ABER	Positive	API	P. falc. & Assoc.	P. vivax	Other specie	AFI	AVI	Number of sprayings	HSR
		(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)	(j)	(k)	(l)
1960	1,073	80,471	7.50	5,066	4.72	583	4,481	2	0.54	4.18	142,848	133.13
	1,104	77,141	6.99	4,464	4.04	670	3,793	1	0.61	3.44	115,948	105.03
	1,137	88,961	7.82	3,911	3.44	1,378	2,531	2	1.21	2.23	128,200	112.75
	1,175	145,012	12.34	3,249	2.77	631	2,618	-	0.54	2.23	271,260	230.86
	1,217	152,898	12.56	2,670	2.19	236	2,433	1	0.19	2.00	373,953	307.27
1965	1,259	131,634	10.46	1,804	1.43	101	1,703	-	0.08	1.35	331,795	263.54
	1,288	102,996	8.00	1,929	1.50	172	1,757	-	0.13	1.36	383,552	297.79
	1,327	97,525	7.35	3,664	2.76	906	2,757	1	0.68	2.08	292,251	220.23
	1,366	88,612	6.49	2,646	1.94	527	2,119	-	0.39	1.55	392,532	287.36
	1,407	83,211	5.91	1,625	1.15	512	1,113	-	0.36	0.79	333,764	237.22
1970	1,448	94,596	6.53	5,937	4.10	4,104	1,833	-	2.83	1.27	379,549	262.12
	1,504	237,477	15.79	4,584	3.05	3,405	1,179	-	2.26	0.78	429,829	285.79
	1,545	301,030	19.48	1,041	0.67	573	467	1	0.37	0.30	427,499	276.70
	1,595	269,098	16.87	819	0.51	543	276	-	0.34	0.17	293,971	184.31
	1,636	344,315	21.05	1,595	0.97	651	944	-	0.40	0.58	197,897	120.96
1975	1,705	368,820	21.63	1,184	0.69	481	703	-	0.28	0.41	180,910	106.11
	1,748	394,995	22.60	666	0.38	307	359	-	0.18	0.21	130,241	74.51
	1,790	384,941	21.51	727	0.41	337	390	-	0.19	0.22	86,915	48.56
	1,831	377,059	20.59	674	0.37	308	365	1	0.17	0.20	60,340	32.95
	1,873	382,942	20.45	263	0.14	73	190	-	0.04	0.10	60,954	32.54
1980	1,914	369,775	19.32	316	0.17	129	187	-	0.07	0.10	64,250	33.57
	1,957	360,172	18.40	304	0.16	97	207	-	0.05	0.11	69,954	35.75
	2,000	387,276	19.36	340	0.17	189	151	-	0.09	0.08	60,330	30.17
	2,044	392,458	19.20	334	0.16	186	148	-	0.09	0.07	55,737	27.27
	2,089	380,135	18.20	341	0.16	154	187	-	0.07	0.09	59,328	28.40
1985	2,134	373,072	17.48	125	0.06	78	47	-	0.04	0.02	56,516	26.48
	2,180	367,839	16.87	126	0.06	48	78	-	0.02	0.04	40,802	18.72
	2,227	388,485	17.44	1,060	0.48	59	1,001	-	0.03	0.45	40,392	18.14
	2,274	403,305	17.74	1,195	0.53	189	1,006	-	0.08	0.44	29,046	12.77
	2,322	404,320	17.41	1,000	0.43	161	839	-	0.07	0.36	18,367	7.91
1990m)	2,370	338,473	14.28	427	0.18	84	343	-	0.04	0.14	19,361	8.17
	2,418	315,359	13.04	381	0.16	105	276	-	0.04	0.11	13,955	5.77
(m)	2,466	336,569	13.65	1,115	0.45	118	997	-	0.05	0.40	26,093	10.58
1992m)	2,515	308,359	12.26	727	0.29	113	614	-	0.04	0.24	37,184	14.78

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 l) HSR = House spraying rate, per 1000 inhabitants.
 m) Information from "Pop. Division of the UN Secretariat, World Population Prospects. The 1992 Revision."

PARAGUAY - Malarionetric Rates 1960-1992



PARAGUAY - MALARIOMETRIC RATES

Year	Total population	Blood slides examined								Sprayings		
		Number	ABER	Positive	API	P. falc. & Assoc.	P. vivax	Other species	AFI	AVI	Number of sprayings	HSR
		(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)	(j)	(k)	(l)
1960	1,728	11,379	0.66	641	0.37	1	640	-	0.00	0.37	161,261	93.32
	1,751	47,045	2.69	1,165	0.67	5	1,159	1	0.00	0.66	171,086	97.71
	1,801	27,995	1.55	1,528	0.85	9	1,519	-	0.00	0.84	56,656	31.46
	1,850	48,184	2.60	5,756	3.11	313	5,443	-	0.17	2.94	0	0.00
	1,910	92,806	4.86	3,443	1.80	313	3,130	-	0.16	1.64	0	0.00
1965	1,969	103,169	5.24	8,851	4.50	961	7,889	1	0.49	4.01	0	0.00
	2,030	82,848	4.08	6,732	3.32	115	6,616	1	0.06	3.26	5,709	2.81
	2,070	131,293	6.34	33,026	15.95	717	32,309	-	0.35	15.61	6,993	3.38
	2,130	164,444	7.72	50,304	23.62	6,636	43,668	-	3.12	20.50	1,519	0.71
	2,180	113,770	5.22	20,743	9.52	794	19,949	-	0.36	9.15	138,627	63.59
1970	2,240	129,509	5.78	10,307	4.60	1,591	8,716	-	0.71	3.89	625,145	279.08
	2,300	157,587	6.85	1,429	0.62	155	1,274	-	0.07	0.55	600,198	260.96
	2,360	169,448	7.18	423	0.18	194	229	-	0.08	0.10	513,048	217.39
	2,430	185,659	7.64	94	0.04	11	83	-	0.00	0.03	374,865	154.27
	2,500	145,879	5.84	41	0.02	2	39	-	0.00	0.02	189,875	75.95
1975	2,600	124,803	4.80	101	0.04	6	95	-	0.00	0.04	156,857	60.33
	2,687	125,132	4.66	217	0.08	11	206	-	0.00	0.08	127,295	47.37
	2,778	152,410	5.49	140	0.05	46	94	-	0.02	0.03	144,286	51.94
	2,872	85,613	2.98	156	0.05	11	145	-	0.00	0.05	120,511	41.96
	2,696	63,070	2.34	156	0.06	37	119	-	0.01	0.04	68,169	25.29
1980	3,068	57,225	1.87	116	0.04	46	70	-	0.01	0.02	86,845	28.31
	3,169	93,899	2.96	140	0.04	23	117	-	0.01	0.04	78,576	24.80
	3,251	101,979	3.14	73	0.02	4	69	-	0.00	0.02	91,664	28.20
	3,359	94,348	2.81	66	0.02	19	47	-	0.01	0.01	51,793	15.42
	3,468	84,630	2.44	49	0.01	10	39	-	0.00	0.01	45,656	13.16
1985	3,580	107,662	3.01	554	0.15	19	535	-	0.01	0.15	66,354	18.53
	3,693	131,196	3.55	4,568	1.24	19	4,549	-	0.01	1.23	55,989	15.16
	3,808	102,912	2.70	4,329	1.14	10	4,319	-	0.00	1.13	46,813	12.29
	3,923	97,532	2.49	3,741	0.95	73	3,667	1	0.02	0.93	40,632	10.36
	4,043	77,081	1.91	2,884	0.71	24	2,859	1	0.01	0.71	39,202	9.70
1990	4,157	89,263	2.15	5,247	1.26	18	5,229	-	0.00	1.26	55,249	13.29
	4,277	98,417	2.30	2,912	0.68	55	2,857	-	0.01	0.67	29,047	6.79
	4,397	127,807	2.91	2,983	0.68	18	2,965	-	0.00	0.67	-	-
1992 m)	4,519	149,523	3.31	1,289	0.29	10	1,279	-	0.00	0.28	69,845	15.46

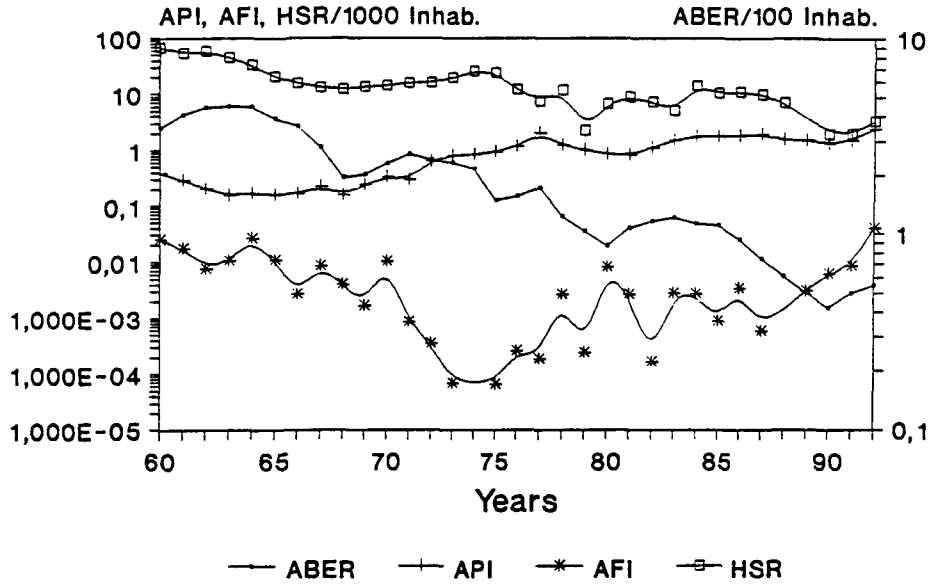
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- a) Estimated population, in thousands of inhabitants.
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PERU - Malarionetric Rates

1960-1992



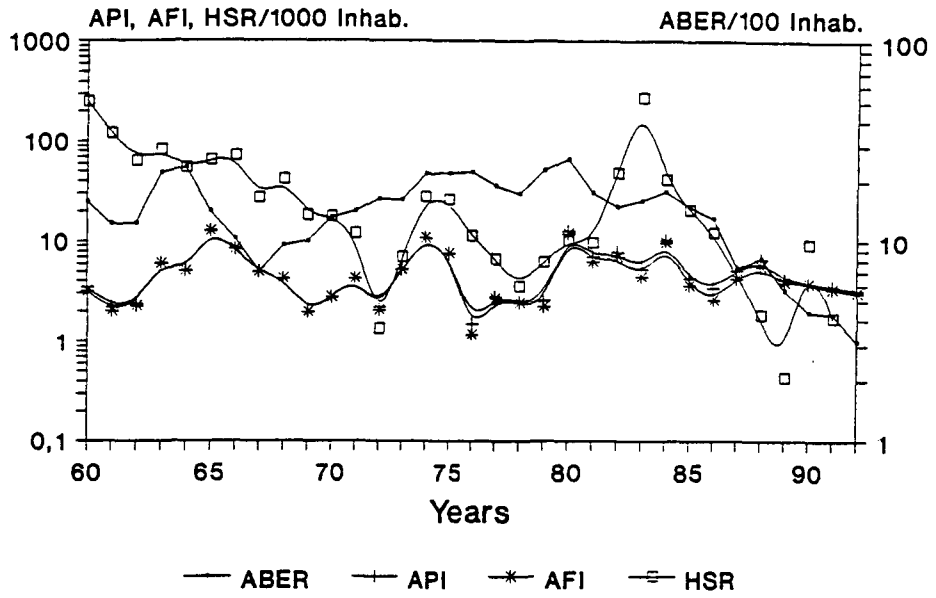
PERU - MALARIOMETRIC RATES

Year	Total population	Blood slides examined								Sprayings			
		Number	ABER	Positive	API	P. falc. & Assoc. P. vivax	Other species	AFI	AVI	Number of sprayings	HSR		
		(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)	(j)	(k)	(l)
1960	9,741	149,791	1.54	4,658	0.48	342	4,265	51	0.04	0.44	669,140	68.69	
	10,022	349,780	3.49	3,906	0.39	256	3,560	90	0.03	0.36	682,491	68.10	
	10,322	417,528	4.05	3,056	0.30	185	2,805	66	0.02	0.27	559,042	54.16	
	10,630	470,639	4.43	2,216	0.21	82	2,052	82	0.01	0.19	627,527	59.03	
1965	10,947	490,568	4.48	1,747	0.16	116	1,484	147	0.01	0.14	500,218	45.69	
	11,272	502,744	4.46	1,934	0.17	302	1,538	94	0.03	0.14	379,184	33.64	
	11,607	452,097	3.90	1,877	0.16	126	1,664	87	0.01	0.14	240,003	20.68	
	11,952	424,993	3.56	2,049	0.17	32	1,915	102	0.00	0.16	186,109	15.57	
1970	12,307	341,937	2.78	2,772	0.23	105	2,591	76	0.01	0.21	162,433	13.20	
	12,675	247,116	1.95	2,010	0.16	52	1,911	47	0.00	0.15	153,893	12.14	
	13,055	263,344	2.02	3,168	0.24	22	3,105	41	0.00	0.24	173,975	13.33	
	13,447	310,237	2.31	4,494	0.33	135	4,282	77	0.01	0.32	188,723	14.03	
1975	13,830	354,765	2.57	4,128	0.30	12	4,092	24	0.00	0.30	218,566	15.80	
	14,220	341,084	2.40	9,270	0.65	5	9,236	29	0.00	0.65	229,605	16.15	
	14,630	339,566	2.32	12,033	0.82	1	12,007	25	0.00	0.82	285,606	19.52	
	14,750	317,522	2.15	12,485	0.85	0	12,485	-	0.00	0.85	383,405	25.99	
1980	15,161	225,114	1.48	14,338	0.95	1	14,324	13	0.00	0.94	366,828	24.20	
	15,573	243,675	1.56	18,462	1.19	4	18,448	10	0.00	1.18	187,410	12.03	
	15,991	275,827	1.72	32,410	2.03	3	32,385	22	0.00	2.03	120,235	7.52	
	16,415	201,489	1.23	20,376	1.24	43	20,312	21	0.00	1.24	192,877	11.75	
1985	16,849	174,565	1.04	17,127	1.02	4	17,117	6	0.00	1.02	37,997	2.26	
	17,295	150,407	0.87	14,982	0.87	138	14,805	39	0.01	0.86	117,684	6.80	
	17,723	189,164	1.07	14,812	0.84	47	14,752	13	0.00	0.83	156,963	8.86	
	18,148	211,100	1.16	20,483	1.13	3	20,480	-	0.00	1.13	132,393	7.30	
1990	18,572	224,650	1.21	28,563	1.54	51	28,511	1	0.00	1.54	95,441	5.14	
	18,995	214,213	1.13	33,724	1.78	51	33,655	18	0.00	1.77	269,129	14.17	
	19,417	213,487	1.10	35,026	1.80	17	35,009	-	0.00	1.80	201,473	10.38	
	19,839	184,636	0.93	36,866	1.86	68	36,783	15	0.00	1.85	216,665	10.92	
1993 m)	20,260	151,276	0.75	39,136	1.93	12	39,122	2	0.00	1.93	202,160	9.98	
	20,684	125,430	0.61	32,359	1.56	0	32,211	148	0.00	1.56	147,702	7.14	
	*	21,113	...	0.00	32,114	1.52	65	32,049	-	0.00	1.52
	**	21,550	90,040	0.42	28,882	1.34	131	28,693	58	0.01	1.33	41,564	1.93
1993 m)	**	21,996	109,654	0.50	33,705	1.53	187	33,502	16	0.01	1.52	43,124	1.96
1993 m)		22,451	123,147	0.55	54,922	2.45	793	64,129	-	0.04	2.41	74,084	3.30

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 m) Information from "Pop. Division of the UN Secretariat, World Population Prospects. The 1992 Revision."
 * Incomplete information. ** Information up to October. *** Information up to November.

SURINAME- Malaria Metrics Rates 1960-1992

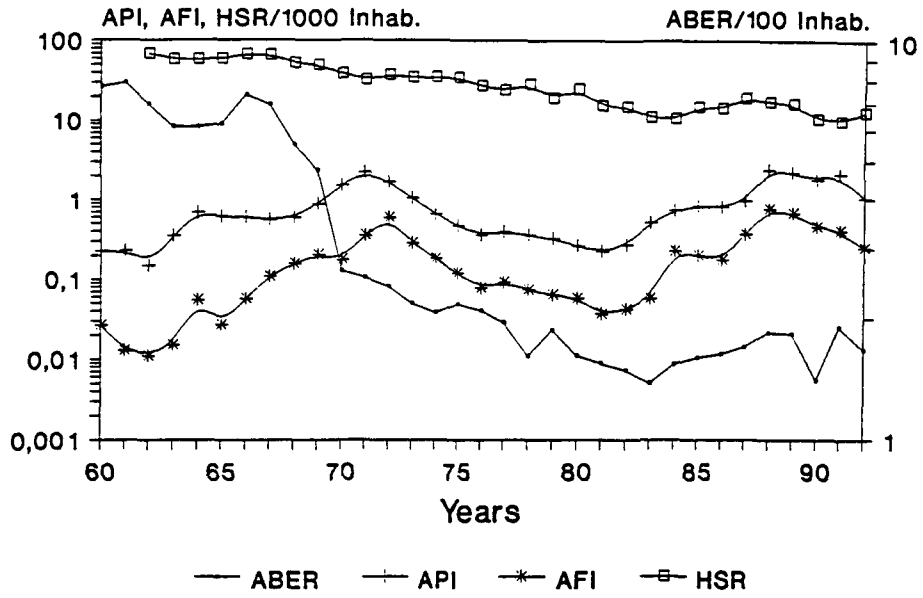


SURINAME - MALARIOMETRIC RATES

Year	Total population	Blood slides examined							Sprayings			
		Number	ABER	Positive	API	P. falc. & Assoc.	P. vivax	Other species	AFI	AVI	Number of sprayings	HSR
1960	275	46,687	16.98	2,703	9.83	2,343	30	330	8.52	0.11	92,468	336.25
	290	45,396	15.65	997	3.44	912	3	82	3.14	0.00	72,444	249.81
	299	36,424	12.18	646	2.16	596	50	-	1.99	0.00	35,338	118.19
	308	37,819	12.28	716	2.32	693	-	23	2.25	0.00	19,381	62.93
	308	67,696	21.98	1,882	6.11	1,845	10	27	5.99	0.00	25,079	81.43
	328	76,555	23.34	1,681	5.13	1,650	5	26	5.03	0.00	17,598	53.65
1965	338	47,744	14.13	4,311	12.75	4,282	7	22	12.67	0.00	21,791	64.47
	348	35,785	10.28	2,933	8.43	2,878	11	44	8.27	0.00	24,519	70.46
	359	25,479	7.10	1,786	4.97	1,766	1	19	4.92	0.00	9,596	26.73
	370	35,339	9.55	1,555	4.20	1,541	2	12	4.16	0.00	15,282	41.30
	381	38,194	10.02	741	1.94	734	1	6	1.93	0.00	6,892	18.09
1970	371	48,702	13.13	1,019	2.75	1,009	10	-	2.72	0.00	6,519	17.57
	370	52,306	14.14	1,546	4.18	1,545	-	1	4.18	0.00	4,423	11.95
	370	59,600	16.11	800	2.16	753	47	-	2.04	0.00	487	1.32
	370	59,448	16.07	1,948	5.26	1,925	23	-	5.20	0.00	2,565	6.93
	370	80,239	21.69	3,984	10.77	3,982	2	-	10.76	0.00	10,096	27.29
1975	365	79,327	21.73	2,741	7.51	2,740	1	-	7.51	0.00	9,335	25.58
	361	79,564	22.04	537	1.49	419	118	-	1.16	0.00	4,033	11.17
	358	67,501	18.86	993	2.77	945	48	-	2.64	0.00	2,379	6.65
	356	61,358	17.24	876	2.46	858	16	2	2.41	0.00	1,243	3.49
	355	80,060	22.55	903	2.54	786	116	1	2.21	0.00	2,198	6.19
1980	355	91,141	25.67	4,445	12.52	4,250	195	-	11.97	0.00	3,611	10.17
	355	61,880	17.43	2,479	6.98	2,228	251	-	6.28	0.00	3,384	9.53
	360	53,257	14.79	2,805	7.79	2,519	286	-	7.00	0.01	17,191	47.75
	367	58,538	15.95	1,943	5.29	1,604	339	-	4.37	0.01	98,761	269.10
	375	66,609	17.76	3,849	10.26	3,665	184	-	9.77	0.00	15,488	41.30
1985	383	56,953	14.87	1,635	4.27	1,380	255	-	3.60	0.00	7,855	20.51
	390	50,969	13.07	1,316	3.37	1,002	314	-	2.57	0.01	4,790	12.28
	398	29,368	7.38	2,044	5.14	1,678	366	-	4.22	0.01	-	0.00
	406	33,564	8.27	2,691	6.63	2,296	395	-	5.66	0.01	729	1.80
*	414	23,364	5.64	1,704	4.12	1,585	119	-	3.83	0.01	176	0.43
1990	422	18,594	4.41	1,608	3.81	1,584	21	3	3.75	0.00	3,959	9.38
m)	429	18,399	4.29	1,490	3.47	1,402	33	55	3.27	0.00	723	1.69
1992m)	438	13,799	3.15	1,404	3.21	1,326	25	53	3.03	0.00	..	0.00

- a) Population in thousands, estimated by PAHO, Technical Information System. Sep/7/93
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VENEZUELA - Malarimetric Rates 1960-1992



VENEZUELA - MALARIOMETRIC RATES

Year	Total population	Blood slides examined							Sprayings			
		Number	ABER	Positive	API	P. falc. & Assoc.	P. vivax	Other species	AFI	AVI	Number of sprayings	HSR
		(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)	(j)	(k)	(l)
1960	7,086	503,777	7.11	911	0.13	126	762	23	0.02	0.11		
	7,365	564,669	7.67	1,674	0.23	194	1,468	12	0.03	0.20		
	7,627	600,511	7.87	1,754	0.23	98	1,630	26	0.01	0.21		
	7,926	548,240	6.92	1,210	0.15	86	1,107	17	0.01	0.14	540,069	68.14
	8,225	499,944	6.08	2,853	0.35	124	2,707	22	0.02	0.33	479,865	58.34
1965	8,525	518,313	6.08	5,884	0.69	471	5,406	7	0.06	0.63	490,884	57.58
	8,824	545,035	6.18	5,364	0.61	237	5,100	27	0.03	0.58	522,616	59.23
	9,123	667,540	7.32	5,481	0.60	518	4,916	47	0.06	0.54	611,665	67.05
	9,423	650,682	6.91	5,257	0.56	1,020	4,215	22	0.11	0.45	623,926	66.21
	9,620	527,453	5.48	5,735	0.60	1,531	4,144	60	0.16	0.43	505,452	52.54
1970	9,940	468,158	4.71	8,740	0.88	2,017	6,652	71	0.20	0.67	492,476	49.54
	10,280	271,449	2.64	15,288	1.49	1,803	13,465	20	0.18	1.31	397,766	38.69
	10,612	268,615	2.53	23,626	2.23	3,762	19,860	4	0.35	1.87	343,936	32.41
	10,939	262,955	2.40	18,062	1.65	6,447	11,608	7	0.59	1.06	403,867	36.92
	11,280	245,733	2.18	11,687	1.04	3,213	8,470	4	0.28	0.75	390,822	34.65
1975	11,632	240,547	2.07	7,648	0.66	2,109	5,535	4	0.18	0.48	407,293	35.01
	12,665	275,048	2.17	5,952	0.47	1,502	4,448	2	0.12	0.35	436,744	34.48
	13,124	274,308	2.09	4,768	0.36	1,017	3,747	4	0.08	0.29	358,814	27.34
	13,595	266,052	1.96	5,304	0.39	1,246	4,047	11	0.09	0.30	326,600	24.02
	14,074	226,546	1.61	5,065	0.36	1,025	4,032	8	0.07	0.29	405,717	28.83
1980	14,552	272,409	1.87	4,722	0.32	928	3,789	5	0.06	0.26	279,186	19.19
	15,024	241,953	1.61	3,901	0.26	862	3,035	4	0.06	0.20	377,080	25.10
	15,487	239,051	1.54	3,377	0.22	562	2,801	14	0.04	0.18	241,749	15.61
	15,944	236,380	1.48	4,269	0.27	660	3,591	18	0.04	0.23	239,213	15.00
	16,397	226,229	1.38	8,400	0.51	929	7,465	6	0.06	0.46	180,940	11.03
1985	16,853	259,099	1.54	12,242	0.73	3,823	8,416	3	0.23	0.50	179,645	10.66
	17,317	276,020	1.59	14,305	0.83	3,447	10,854	4	0.20	0.63	257,598	14.88
	17,790	289,504	1.63	14,361	0.81	3,139	11,221	1	0.18	0.63	257,688	14.48
	18,270	311,055	1.70	17,988	0.98	6,851	11,137	-	0.37	0.61	359,731	19.69
	18,756	346,616	1.85	45,827	2.44	14,579	31,233	15	0.78	1.67	328,823	17.53
19,245	352,784	1.83	43,374	2.25	13,094	29,794	486	0.68	1.55	322,089	16.74	
1990 *	19,736	277,164	1.40	35,082	1.78	9,135	25,944	3	0.46	1.31	208,803	10.58
**	19,736	375,473	1.90	42,826	2.17	8,182	34,641	3	0.41	1.76	200,848	10.18
1992 **	20,186	336,571	1.67	21,416	1.06	5,004	16,365	47	0.25	0.81	260,231	12.89

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