

are perfectly understood, these procedures have been very poorly implemented. Therefore, the solution to the problem lies not in a search for fresh control procedures or in development of vaccines that confer longer immunity, but in a more effective marshaling of existing institutional and managerial capa-

bilities to make use of the available technology. This requires a political decision to undertake programs that will enjoy the resources and continuity needed to eliminate transmission from dogs and cats to people and also to reduce the damage done to the health and productivity of the Region's livestock.

THE WORLD MALARIA SITUATION, 1979

Progress against malaria has been made recently in some countries, while in others the malaria prevalence is increasing. However, in considering available data it must be borne in mind that in all probability they provide an underestimate of the true parasite reservoir persisting in the affected countries for the following reasons: (1) countries do not report on all their malarious areas, and (2) case detection activities have been reduced drastically in some countries due to the high cost of maintaining a full surveillance system on a total coverage basis.

The key points to stress are that (a) there is a real risk of malaria being reintroduced as an endemic disease in areas that were freed of malaria but that are still receptive to it, especially in view of increasing international travel; and (b) there is danger of a nonimmune person being infected when traveling abroad in malarious countries. Providing advice to international travelers is a joint responsibility of the traveler's country of origin and his country of destination.¹

¹Sources: World Health Organization, Synopsis of the world malaria situation, 1979, *Weekly Epidemiological Record* 56(19):145-149, 1981, and Malaria situation by large epidemiological areas: Period from January to December 1979, *Weekly Epidemiological Record* 56(21):162-166, 1981.

Africa North of the Sahara (Population 89 Million)

Most of the 72 million people living in originally malarious areas can be considered at very limited risk. Egypt, the Libyan Arab Jamahiriya, and Tunisia reported fewer cases in 1979 than in 1978. In Algeria, 73 cases were reported as against 30 in 1978. In Morocco, the malaria incidence, which up to 1978 showed a downward trend, increased in 1979 with 397 cases reported (as against 64 in 1978). Defective surveillance caused the extension of a limited focus in Khémisset Province. Indigenous cases are reported from eight other provinces, and for the first time since 1974 indigenous *P. falciparum* cases were detected in two provinces.

Africa South of the Sahara (Population 367 Million)

Lesotho, the Seychelles, St. Helena, and the major part of South Africa are naturally malaria-free. La Réunion was officially registered as having eradicated malaria. Elsewhere, the number of cases reported from 31 countries in 1979 was 5.82 million, certainly representing only a fraction of the true number of cases (see Table 1).

Table 1. Malaria cases reported in January-December 1979, by geographic region and country.

Region and country or territory ^a	No. of cases reported	Region and country or territory ^a	No. of cases reported
<i>Africa South of the Sahara:</i>		<i>Africa North of the Sahara:</i>	
Angola	522,358	Algeria	73
Benin	122,405	Egypt	474
Botswana	5,954	Libyan Arab Jamahiriya	134
Burundi	94,049	Morocco	397
Cape Verde	621	Tunisia	6 ^k
Central African Republic	167,346		
Chad	94,545 ^b	<i>Western Hemisphere:</i>	
Comoros	30,352 ^c	Argentina	936
Congo	147,521	Belize	1,391
Djibouti	113 ^b	Bolivia	14,712
Equatorial Guinea	37,454 ^d	Brazil	147,630
Ethiopia	31,658 ^e	Canal Zone	0
Gabon	16,776 ^f	Colombia	60,957
Gambia	51,993 ^g	Costa Rica	307
Ghana	413,319 ^h	Dominican Republic	3,080
Guinea	52,210 ^b	Ecuador	8,207
Guinea Bissau	160,931	El Salvador	77,976
Ivory Coast	349,046	French Guiana	604
Kenya	437,660 ⁱ	Guatemala	69,039
Liberia	232,112	Guyana	2,294
Madagascar	302,336	Haiti	41,252
Malawi	23,237	Honduras	25,297
Mali	180,176	Mexico	20,983
Mauritania	24,899 ^b	Nicaragua	18,418
Mauritius	127	Panama	316
Mozambique	—	Paraguay	116
Namibia	—	Peru	17,127
Niger	384,029	Suriname	903
Nigeria	1,021,331	Venezuela	4,705
Réunion	52		
Rwanda	137,047	<i>Western Asia:</i>	
São Tomé and Príncipe	7,478	Afghanistan	34,444
Senegal	508,010	Bahrain	273
Sierra Leone	79,991	Democratic Yemen	4,083
Somalia	11,343	Gaza Strip	1 ^b
South Africa	2,007	Iran	22,175
Sudan	12,082	Iraq	4,012
Swaziland	489 ^c	Jordan	320
Togo	294,562	Oman	2,111
Uganda	20,305	Pakistan	12,304
United Republic of Cameroon	31,585 ^b	Qatar	168 ^b
United Republic of Tanzania	485,956 ^b	Saudi Arabia	3,192
Upper Volta	217,146	Syrian Arab Republic	2,550
Zaire	317,533 ^g	United Arab Emirates	2,502
Zambia	10,580	Yemen	3,838 ^l
Zimbabwe	87,647 ^j		

^aCountries or territories from which malaria has been eradicated are not included in this table.

^b1978 data.

^c1976 data.

^d1971 data.

^eEight months' data.

^fFive months' data.

^gFifty-two week period.

^h1977 data.

ⁱSix months' data.

^j1974 data.

^kJanuary-September 1979 data.

^lTihama region only

^mUpdated figure, breakdown by areas not available.

Table 1. (Cont.)

Region and country or territory ^a	No. of cases reported	Region and country or territory ^a	No. of cases reported
<i>Central Asia:</i>			
Bangladesh	49,776	Malaysia, West	10,543 ^m
India	3,064,697	Sabah	33,324
Maldives	329	Sarawak	1,068
Nepal	12,131	Papua New Guinea	117,670
Sri Lanka	48,004	Philippines	87,421
		Solomon Islands	26,357
		Thailand	302,658 ^m
		Vanuatu	2,935
		Viet Nam	40,782 ^k
<i>Eastern Asia and Oceania:</i>			
Burma	14,515		
China	2,384,543		
East Timor	-		
Indonesia	165,911		
Democratic Kampuchea	-		
Republic of Korea	0		
Lao People's Democratic Republic	-		
		<i>Europe, Including Turkey and the USSR:</i>	
		Turkey	29,323
		USSR	-

Northern America (Population 244 Million)

The whole area is malaria-free.

Middle America (Population 120 Million)

Of the 69 million people living in originally malarious areas, 20 million were living in areas freed from the disease in 1979 and 28 million were living in areas where transmission had been interrupted; 12 million people were protected by antimalaria measures, but antimalaria measures had been suspended in the remaining areas for various reasons.

In the Caribbean, Cuba, Dominica, Grenada, Guadeloupe, Jamaica, Martinique, Puerto Rico, Saint Lucia, Trinidad and Tobago, and the United States Virgin Islands—all of which had eradicated the disease—remained free from autochthonous malaria, although the number of imported malaria cases continued to increase to 312 in 1979 (as compared with 225 in 1978 and 177 in 1977).

In the Dominican Republic, several foci of transmission were reestablished in the maintenance areas (there were 3,080 reported cases in 1979 versus 159 in 1975).

In Haiti, large-scale application of insecticides was suspended and antimalarial drugs were distributed to control occasionally observed outbreaks.

In Costa Rica, the principal antimalaria activities continued to be directed toward preventing the reestablishment of transmission from imported cases. In 1979, large population movements in the border areas resulted in an increase of imported cases. Two small *P. vivax* outbreaks in the consolidation phase area (El Roble de Puntarenas and Río Claro) were controlled by intensive remedial measures.

In Panama, malaria transmission occurred only in some localities of the Provinces of Darién and Bocas del Toro. Despite intensified antimalaria activities in these areas, progress has been slow because of difficult access, great local population movements (in Bocas del Toro), and migratory movements along the frontier region (in Darién).

In Mexico, areas with a population of 5.3 million were transferred to the maintenance phase, and an area with 2.5 million inhabitants was advanced from the attack to the consolidation phase.

In Belize, although the number of reported

malaria cases did not increase in 1979, transmission seemed to be spread more widely than in the previous year.

In El Salvador, the vector's multiple resistance to insecticides commonly used in malaria programs continued to be the major problem. Other measures (antilarval measures, antimalarial drugs, biological control) were applied, but they provided only limited coverage. The number of cases reported increased from some 53,000 in 1978 to about 78,000 in 1979.

In Guatemala, the number of cases registered during the last five years increased more than tenfold, from some 5,000 in 1975 to over 69,000 in 1979.

In Honduras, proper evaluation of the malaria situation became difficult as a result of administrative problems derived from structural changes.

In Nicaragua, where diversified antimalaria measures have produced satisfactory results since 1976-1977, activities have practically been suspended, and an increase in the malaria incidence has been observed (some 18,000 cases being reported in 1979 versus 11,000 cases in 1978).

South America (Population 234 Million)

The southern and central parts of Argentina, all of Chile, the southern tip of Brazil, all of Uruguay, and certain high-altitude areas are naturally malaria-free. Ninety-three million people were living in originally malarious areas in 1979, of which 30 million were in areas freed of the disease and 41 million were in areas where transmission had been interrupted. Sixteen million inhabitants were covered by malaria control measures; but in other areas with a population of 6 million, measures were suspended for various reasons.

Of the countries or areas where malaria transmission had once been practically terminated, only Paraguay showed no evidence of any reestablishment of malaria endemicity. Among the 116 cases reported in 1979, 91 were imported and 18 introduced. As a safe-

guard, part of the country with high receptivity and vulnerability is still under DDT residual house spraying. The former endemic zone is now becoming economically the most prosperous area.

Argentina, French Guiana, and Guyana together reported a total of 3,834 malaria cases, versus 1,518 cases in 1978. In Argentina, the increase was mainly due to delayed application of remedial or control measures. In French Guiana, where the cases were distributed in all malarious areas, control measures included the continuation of DDT residual house spraying (in attack phase areas) and considerably increased distribution of medicated salt. In Guyana, the situation became very critical as transmission spread closer to the heavily populated coastland, which has been in the maintenance phase since 1961.

Ecuador, Suriname, and Venezuela maintained the same degree of progress as in 1978.

An increase in the number of malaria cases in Brazil (148,000 in 1979 versus 122,000 in 1978) was due to outbreaks observed in colonization areas of the Federal Territory of Rondônia and the State of Pará; the rest of the country continued to make progress.

In Bolivia, where the number of malaria cases reported reached 14,700 in 1979 (versus 6,700 in 1976), the entire area previously in the consolidation phase was reverted to the attack phase. However, a new plan for application of attack measures in the entire malarious area had not yet been fully implemented.

In Colombia, with a high level of about 60,000 cases annually during the last three years, control efforts were merely sufficient to stop further deterioration. The principal causes of continued transmission were disorganized agricultural colonization, evasive behavior by one of the vectors (*A. nuneztovari*), resistance of *P. falciparum* to chloroquine, difficult access in certain areas, and administrative and financial problems.

Peru decided to make its malaria control effort part of its general health service activities. As a result of administrative problems derived from the structural changes, however, case-

finding activities and control operations were reduced, and a proper evaluation of the malaria situation became difficult.

*Europe, Including Turkey and the USSR
(Population 791 Million)*

In Turkey, the number of cases reported decreased further to 29,000 (from 89,000 in 1978 and 115,000 in 1977). The number of imported malaria cases in Europe was, for the first time in many years, lower than in a preceding year, possibly due to underreporting.

Asia West of India (Population 179 Million)

Of the 153 million people living in originally malarious areas, 9 million were living in areas freed of malaria and 34 million were in areas where transmission had been interrupted.

Some areas in Afghanistan, Iran, Jordan, Kuwait, Saudi Arabia, the Syrian Arab Republic, and Yemen are naturally malaria-free. Cyprus, Israel, Lebanon and certain areas of Jordan and the Syrian Arab Republic have been freed of the disease. No autochthonous malaria cases were detected in Bahrain, Cyprus, Israel, Lebanon, or Qatar. Three introduced falciparum infections were reported from the Zarqa River area in Jordan, but exhaustive investigations did not reveal any further cases.

In Iran, the number of cases reported decreased from 35,000 in 1978 to 22,000 in 1979. However, malaria transmission persisted in some areas of the south, and a limited focus with nearly 100 local cases occurred near Lahijan in the north.

The Syrian Arab Republic reported 2,500 cases, versus 3,400 in 1978.

In Saudi Arabia, the eastern and northern provinces remained malaria-free, and transmission has been interrupted in most of the western province. More than 90 per cent of the malaria cases were detected in the southern province. Since 1977, DDT spraying has

gradually been extended in this area.

In Iraq, malaria transmission continued in the northern region. The central and southern regions remained generally malaria-free with some exceptions.

In Pakistan, 12,000 cases were detected (versus 16,000 in 1978), but surveillance coverage remained at a low level. The percentage of falciparum infections continued to increase, reaching 40 per cent (versus 33 per cent in 1978).

In Afghanistan, the number of malaria cases reported was 34,000 (versus 44,000 in 1978), but surveillance coverage was incomplete.

In Democratic Yemen, Oman, the United Arab Emirates, and Yemen efforts continued to extend malaria control activities to larger parts of the population.

Central Asia (Population 765 Million)

There are some naturally malaria-free areas at high altitudes in India, Nepal, and Sri Lanka.

A total of 721 million people were living in originally malarious areas exposed to various degrees of risk. The number of malaria cases reported from India and Sri Lanka continued to decrease in 1979.

In India there were 3.1 million cases, as compared to 4.1 and 4.7 million in 1978 and 1977. The proportion of *P. falciparum* cases increased, however, from about 10 per cent in 1978 to over 15 per cent in 1979.

In Sri Lanka, the number of malaria cases was 48,000 as compared to 70,000 in 1978 and 262,000 in 1977.

In the Maldives, the number of cases decreased by 16 per cent to 329.

In Nepal, 12,000 cases were confirmed as compared to 19,000 in 1978. Numerous *P. falciparum* cases continued to be imported from India (many of them resistant to chloroquine), but the incidence of *P. falciparum* cases within Nepal showed a decline.

In Bangladesh, the situation continued to deteriorate as more low-risk areas were af-

fects. The blood examination rate of 1.7 per cent of the population (versus 1.8 per cent in 1978) was the lowest recorded, but there was a 50 per cent increase in cases in 1979 (50,000, versus 33,000 in 1978).

Eastern Asia and Oceania
(Population 1,537 Million)

Of the 1,220 million people living in originally malarious areas, 260 million were living in areas freed of the disease and 388 million were in areas where transmission had been interrupted.

Australia, Brunei, the Democratic People's Republic of Korea, Hong Kong, Japan, Singapore, and most of Oceania are either naturally malaria-free or have eradicated malaria. They remained free from indigenous malaria.

The number of imported malaria cases continued to rise in Australia, reaching 443 cases in 1979 as compared with 323 in 1978. The relative prevalence of falciparum infections has also shown a steady increase, rising from 5.7 per cent in 1973 to 30 per cent in 1979. Many of these cases were resistant to chloroquine.

In Singapore, 208 malaria cases were reported (versus 166 in 1978).

In China, malaria morbidity has shown a downward trend in recent years. In 1979 there were 2.4 million cases, most of them reported on the basis of clinical diagnosis (versus 3.1 million in 1978 and 4.2 million in 1977). About 80 per cent of the 1979 cases originated in the large rice cultivation areas of Central China and in the plain between Huanghe and Huaihe. Examination of blood specimens has shown that *P. falciparum* is found only in the southern provinces. Except for some parts of Hainan Island and some border areas in Yunnan Province, where malaria morbidity is still comparatively high, the major parts of the southern provinces have an incidence of less than 5 cases per 10,000 inhabitants.

The malaria situation improved in Indonesia, Malaysia, the Philippines, and Viet Nam.

In Indonesia, a marked reduction of cases was reported in Java and Bali (79,000 cases in 1979 compared with 121,000 in 1978); there were 87,000 cases in the outer islands in 1979 versus 60,000 in 1978.

In Peninsular Malaysia the number of cases remained at about 10,500, a large proportion of them related to moving population groups. Nearly 90 per cent of the population lives in areas where transmission has been interrupted. Special teams have been created to intensify antimalaria measures in the land development areas.

In Malaysia (Sarawak) the situation continued to be satisfactory. A total of 1,068 malaria cases were reported (versus 1,550 in 1978), about 55 per cent of them originating in border areas. In Malaysia (Sabah), where the situation has changed little in the past few years, some encouraging improvement was reported in 1978 and 1979.

In the Philippines, some 87,000 cases were reported compared with 105,000 in 1978. The improvement was noticed particularly in areas of low endemicity.

In Viet Nam, malaria in the northern provinces is limited to specific foci. In the central and southern provinces the situation is said to be steadily improving. There were no epidemic outbreaks in 1979, and the slide positivity rate was 5.1 per cent (versus 15-20 per cent in 1975).

In Thailand, 303,000 cases were reported as compared with 329,000 in 1978, but this reduction may have been largely due to favorable climatic conditions.

In the Lao People's Democratic Republic, where indoor insecticide spraying was resumed in 1977 and extended (in Vientiane Province) in 1978, operations were further expanded to include Champassak Province in 1979.

In Vanuatu (formerly New Hebrides) and Papua New Guinea, the epidemiologic situation did not show much change.

In Burma, the percentage of falciparum infections increased from 70 per cent in 1978 to

77 per cent in 1979. Malaria morbidity was estimated at 45 cases per 1,000 inhabitants. Malaria ranks as a principal cause of hospital deaths.

In the Solomon Islands, the resurgence of malaria continued in 1979, with 26,000 cases reported as compared to 20,000 in 1978 and 11,000 in 1977.

ARTICLES IN THE BOLETIN DE LA OFICINA SANITARIA PANAMERICANA

The following are abstracts of articles recently published in Spanish or Portuguese in the monthly Boletín de la Oficina Sanitaria Panamericana.

Leptospirosis in Iquitos, Loreto Department, Peru—*Julia Liceras de Hidalgo and Elva Mejía D.; February 1981, pp. 152-159.*

Iquitos, the tropical capital of Peru's eastern Loreto Department, is situated some 20 meters above the level of the Amazon River. In 1973, antibodies to *Leptospira icterohaemorrhagiae*, serotype copenhageni, were identified in sera from Peruvian military personnel stationed in the city. Because of this finding, in 1974 the authors sought to isolate leptospires from the kidneys of captured rats and domestic swine in Iquitos. They also tested sera from oil workers, military personnel, and the forementioned animals for antibodies to 24 leptospira serotypes.

Leptospires (serotype copenhageni) were isolated from five of 25 rats (two *Rattus rattus* and three *Rattus norvegicus*) captured at two military installations. Sera from two of these rats yielded antibody titers positive for leptospira strains copenhageni (R-410) and monyusk (S.E.) previously isolated elsewhere in Peru. The five copenhageni isolates proved virulent when inoculated into guinea pigs, causing deaths in four to eight days.

In addition, leptospires were isolated from five of 59 kidney tissue samples obtained from swine at the Iquitos slaughterhouse. Three of these 59 swine yielded serotype pomona, one yielded serotype goiano, and one yielded a

new serotype in the Sherman serogroup. The three pomona isolates produced alterations in inoculated guinea pigs that were visible at autopsy. Sera from 12 of the 59 swine were positive for serotype pomona, and seven of these 12 sera were positive for other serotypes as well. Specifically, four were positive for serotype autumnalis, four for bratislava, three for pyrogenes, two for butembo, one for monyusk, and one for bataviae, paidjan, and shermani.

Twenty of 100 sera obtained from oil exploration workers and 15 of 40 patients at the Iquitos military hospital tested positively for antibodies to one or more *Leptospira* serotypes, the main serogroups involved being Australis, Sherman, Semaranga (serotype patoc), and Cynopteri.

Isolation of the goiano serotype from swine kidney culture supports the hypothesis that swine are the main reservoir for leptospires belonging to the Hebdomadis serogroup in Peru's Amazon region. Similarly, isolation from swine of leptospires belonging to the Sherman serogroup helps to explain the presence of antibodies to this serogroup in human and animal sera from San Martín and Loreto departments. This finding represents the first time infection of a domesticated animal with leptospires belonging to the Sherman serogroup has been confirmed.

Isolation of serotype copenhageni from rats