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WORLD HEALTH ORGANIZATION



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MALARIA

Of the 39 Member States of PAHO, 21 have malaria transmission. In these countries, 77 million people live in areas of moderate and high risk malaria transmission, producing approximately 1.2 million cases per year. Since 1992 these countries have adopted the Global Malaria Control Strategy, though with some limits to its complete implementation. The Roll Back Malaria initiative aims at the creation of a movement at the global, regional, national, and local levels to further strengthen the implementation of the Global Malaria Control Strategy.

Roll Back Malaria encourages the use of evidence-based strategies, community-level action, and effective joint action between governments and national and international development agencies. It recognizes that sustained success in rolling back malaria inevitably calls for development of the health sector, so that it can better address a range of priority health problems. It seeks to mainstream efforts to roll back malaria throughout the range of community-level health activities already being carried out by societies at risk of malaria. The initiative is expected to evolve into a social movement on a global scale and to engage local communities that are not yet rolling malaria back.

The Roll Back Malaria initiative is based on the acknowledgement that malaria control must be an integral function of an effective health system with a strong community involvement. Vector control must be part of it through the application of cost-effective and site-specific targeted methods. The utilization of a combination of methods is aimed at reducing the total reliance on residual insecticides over the next few years.

This subject was discussed at the 126th Session of the Executive Committee and is being presented to the 42nd Directing Council for its deliberation and consideration of the resolution proposed by the Executive Committee to the Directing Council for adoption (Resolution CE126.R19 annexed). Additional detailed information is provided in the document "Status of Malaria Programs in the Americas" (CD42/INF/1) available to the Directing Council.

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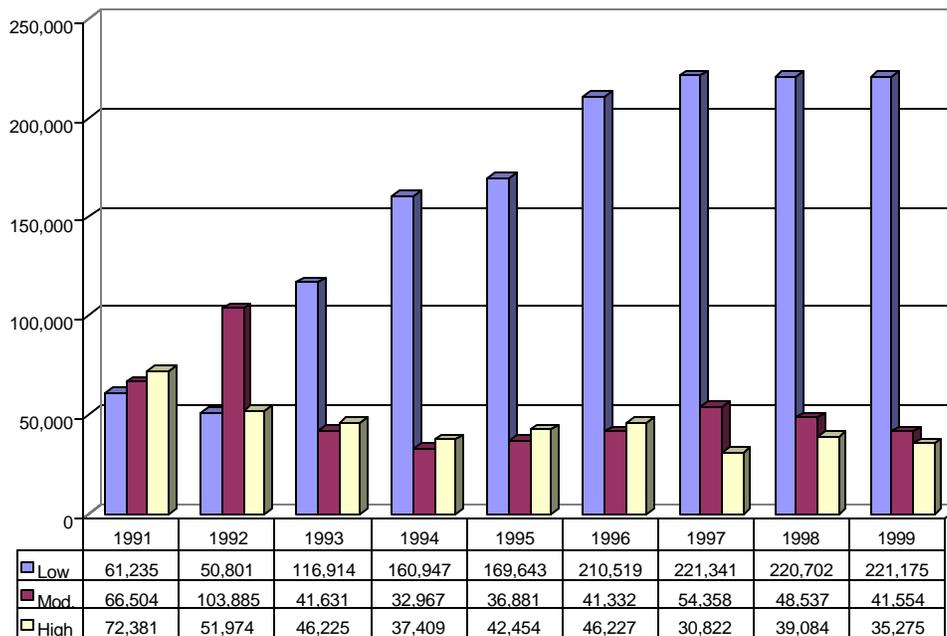
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Annex: Resolution CE126.R19

1. Current Malaria Situation

In 1999, there were 818 million people living in the Region of the Americas. Of these, 299 million, in 21 countries, were living in areas where ecological conditions were propitious for the transmission of malaria. However, of these, 222 million are exposed to low or extremely low risk of malaria transmission. The remaining 77 million people live in areas with moderate and high risk of transmission (Figure 1).

Figure 1: Population Living in Malaria Endemic-Areas According to Transmission Level, 1991-1999



The API (Annual Parasite Index) in the Region ranges from a low of 0.18/1,000 in Mexico to 309.8/1,000 in Suriname. An analysis by subregion indicates that Brazil reported the greatest absolute number of malaria cases (51.7%), followed by the countries of the Andean subregion, which accounted for 33.1% of all cases (Figure 2).

However, the greatest risk of transmission was registered in the subregion that includes areas of French Guiana, Guyana, and Suriname (API = 127.5/1,000), followed by parts of Brazil (API = 118.8/1,000), as shown on Figure 3.

Figure 2: Distribution of Malaria Cases in the American Region, 1999

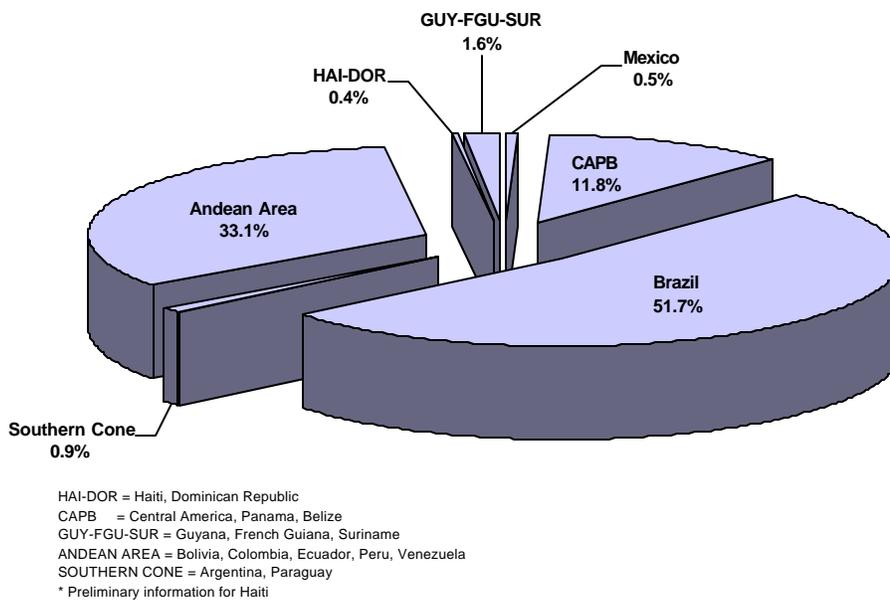
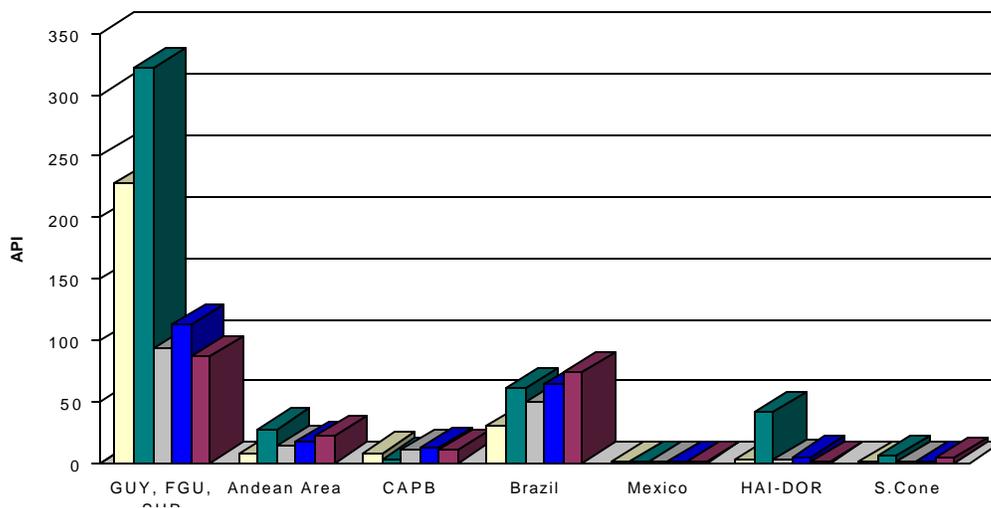


Figure 3: Annual Parasitic Indices (API)* by Geographic Subregion, 1994, 1999



The epidemiological distribution of malaria in the Americas has changed due to a decrease in the prevalence of *Plasmodium falciparum* malaria in the Brazilian Amazon. This decrease is tied to an improvement in case management by means of early diagnosis and immediate treatment, a decrease in uncontrolled mining activity, and less population movement as a result of the stabilization of agricultural colonization projects. The decrease in the Brazilian Amazon has been accompanied by an increase in the prevalence of *P. falciparum* in the forested areas of the Andean subregion, mainly in the Amazon basin. The Pacific coast of Peru, Ecuador, and Colombia has experienced a sizable increase in both the number and spread of malaria cases, especially *P. falciparum* malaria.

The major operational improvement associated with the reduction in the *P. falciparum* death rate is the increase in coverage with second- and third-line treatments. Table 1 shows the remarkable availability of treatment that followed the El Niño phenomenon along the Andean Pacific coast, despite the inaccessibility of populations exposed to *P. falciparum* and epidemics. It displays the availability of treatment per diagnosed case, ranging from 0.57 to 241.8 first-line treatments per case reported. Up to 1999 all countries had an adequate supply of effective anti-malarious therapy. In 1999 however, all countries, with the exception of Colombia, experienced problems with drug supply to treat *P. falciparum*-resistant strains. This reduced availability of effective drugs against *P. falciparum*-resistant strains in Bolivia, Brazil, Ecuador, Peru, and Venezuela is among the key risk factors that might account for a potential increase in the number of resistant-strain epidemics in the years to come.

On the other hand, chloroquine resistance is highly prevalent in South America, although there is still some clinical response to chloroquine in the Andean countries. The right column of Table 2 presents the current anti-malarial drug regimens recommended by each endemic country. Sulfadoxine/pyrimethamine resistance is also widespread and quinine and tetracycline are increasingly being used as first-line antimalarials in Colombia and the Guyanas. Peru has defined three different antimalarial drug regimens for its national drug policy, due to the various levels of *P. falciparum* resistance in the country. In some areas of the Brazilian Amazon, mefloquine has been introduced as first-line treatment of *P. falciparum* infections, following diagnosis with a dipstick test. Artemisinin derivatives are still reserved for severe and complicated malaria. Isolated chloroquine treatment failures of *Plasmodium vivax* infections have been reported recently but have not confirmed by epidemiological studies.

Table 1. Antimalarial Treatment Completed in 1999

Countries and territories by geographic subregion	Treatments complete @ 1,500 mg of 4 amino quinolines	Number of reported cases	Number of first-line treatments available per case reported	Number of <i>P. falciparum</i> treatments completed	Number of <i>P. falciparum</i> and mixed cases reported	Number of second-line treatments available per <i>P. falciparum</i> case
Mexico	839,733	6,402	131.17	0	16	0.00
Belize	8,599	1,850	4.65	0	52	0.00
Costa Rica	38,130	3,998	9.54	0	15	0.00
El Salvador	297,376	1,230	241.77	0	9	0.00
Guatemala	210,107	45,098	4.66	0	1,707	0.00
Honduras	496,732	46,740	10.63	0	1,220	0.00
Nicaragua	2,270,800	38,676	58.71	0	1,689	0.00
Panama	19,100	936	20.41	0	40	0.00
Dominican Rep.	130,478	3,589	36.36	0	3,584	0.00
Haiti ^	...	1,196	...	...	1,196	...
French Guiana	...	5,307	...	...	4,528	...
Guyana	23,300	27,283	0,85	39,244	16,144	2.43
Suriname	12,096	13,939	0.87	8,301	11,685	0.71
Brazil	935,150	609,594	1,53	171,195	114,605	1.49
Bolivia	70,800	50,037	1.41	6,085	7,557	0.81
Colombia	195,230	66,845	2.92	112,101	25,389	4.42
Ecuador	177,842	87,620	2.03	110	49,993	0.00
Peru	94,259	166,579	0.57	57,653	67,169	0.86
Venezuela	79,497	19,086	4.17	1,576	3,531	0.45
Argentina	467	222	2.10	...	...	...
Paraguay	35,600	9,947	3.58	0	2	0.00

... No information available

^ Haiti – Partial information only

Table 2. *Plasmodium falciparum* in the Americas, 1994–1999

Countries	Years	Population at high risk as a proportion of the total population	<i>P. falciparum</i> cases 1994/1999 (% of total number of cases)	Deaths from malaria 1994/1999	<i>P. falciparum</i> drug policy (in order of therapeutic lines)
Bolivia	1994	0.5% (34K/7.0M)	4,700 (13.8%)	29	1) Quinine 7 days + Tetracycline 7; 2) Mefloquine.
	1999	14.1% (1.2M/8.1M)	7,557 (15.1%)	1*	
Brazil	1994	2.3% (3.7M/159M)	172,000 (30.5%)	413	1) Quinine 7 days + Tetracycline 7; 2) Mefloquine; 3) Artemisinin.
	1999	2.0% (3.3M/168M)	114,605 (18.8%)	75*	
Colombia	1994	8.4% (2.9M/34.5M)	31,000 (24.4%)	81	1) Amodiaquine + Primaquine; 2) Sulfa + Pyrimethamine; 3) Quinine 7+ Tetracycline 7 days.
	1999	7.5% (3.1M/41.6M)	25,389 (37.98%)	12*	
Ecuador	1994	7.6% (853K/11.2M)	10,000 (33.3%)	67	1) Chloroquine + Primaquine; 2) Sulfa + Pyrimethamine.
	1999	19.8% (2.5M/12.4M)	49,993 (57.2%)	16*	
French Guiana	1995	6.2% (9.1K/147K)	4,100 (97.6%)	–	1) Quinine 3 days + Doxycyclin; 2) Halofantrine + Doxycyclin.
	1999	9.2% (16K/174K)	4,528 (85.3%)	5*	
Guyana	1994	6.5% (53K/825K)	22,000 (56.4%)	150	1) Quinine 3 days + Clindamycin; 2) Sulfa + Pyrimethamine.
	1999	70.8% (605K/855K)	16,144 (59.2%)	34**	
Peru	1994	9.1% (2.1M/23M)	21,000 (17.2%)	39	1) Quinine 3 days + Tetracycline 7; 2) Sulfa + Pyrimethamine
	1999	10.1% (2.5M/25.2M)	67,169 (40.3%)	49*	
Suriname	1994	7.6% (32K/418K)	4,300 (91.5%)	20	1) Sulfa + Pyrimethamine; 3) Quinine 3 days + Clindamycin
	1999	10.4% (43K/415K)	11,644 (83.5%)	7**	
Venezuela	1994	0.7% (143K/21M)	3,300 (24.1%)	17	1) Chloroquine + Primaquine 2) Sulfa + Pyrimethamine; 3) Quinine 3 days + Tetracycline 7
	1999	1.1% (263K/23.7M)	3,531 (18.5%)	26*	
					CRUDE MORTALITY RATE
TOTAL 1994		3.4% (9.8M/289.9M)	268,000 (24.0%)	816	8.3/100,000 exposed population
TOTAL 1999		4.8% (13.5M/280.4M)	300,560 (28.7%)	225*	1.7/100,000 exposed population

K = 1.000

M = 1.000.000

* Preliminary data, 1999

** 1998 Data

– Not reported

2. Current Malaria Control Strategy Situation

The Region of the Americas has endorsed the Global Malaria Control Strategy (GMCS), which was adopted by the Ministerial Conference of 1992. The 21 countries with malaria have been reorienting their control programs in keeping with the GMCS adopted in Amsterdam in 1992.

The major thrust of the GMCS was to shift the traditional emphasis away from vector control toward an adequate management of human disease. This move required that the traditional disease eradication objective be integrated into a multiple disease approach with the consequent expansion of basic health service coverage to secure early diagnosis and immediate treatment of the population at risk of acquiring malaria.

The four basic elements for GMCS implementation are to: (1) provide early diagnosis and immediate treatment; (2) plan and implement preventive and sustainable measures, including vector control; (3) detect, contain, and prevent epidemics promptly; and (4) strengthen the capability of local health services to periodically evaluate the epidemiological situation in the Region and enable control programs to reduce the social and economic burden of malaria on the population. Of these four technical elements, in some countries only the first one has been implemented fully.

Implementation of this first element of the GMCS in the Region has resulted in a significant drop in the malaria-specific mortality rate. In 1994, the first year with comparable records, the *P. falciparum* crude mortality rate was 8.3 per 100,000 exposed population. By 1999, the mortality rate dropped to 1.7 per 100,000 exposed population.

The implementation of the GMCS is ongoing, with a high degree of variability among countries of the Region. Some countries have greatly decreased their malaria mortality rates over the last four years and have shown that the emphasis on human disease management is a more cost-effective investment than the traditional vector control approach, particularly where the malaria parasite *P. falciparum* is more prevalent. However, in areas and countries where *P. vivax* parasite is the prevalent species, as well as in areas where *P. falciparum* transmission has been brought under control, *P. vivax* prevalence and incidence continues to increase or is little affected. This effect is caused by several factors, which vary from the relapsing nature of *P. vivax* to the extrinsic conditions favoring transmission caused by the “ruralization” of the periphery of larger cities.

The improvements in the availability of effective second and third-line therapy in Bolivia, Brazil, Colombia, Guyana, Peru, and Venezuela compared with previous years may be the result of broader coverage of the GMCS, which calls for an emphasis on optimal clinical management of the disease. Table 3 shows the results of the microscopic examination of 2.5 million suspected cases. The local health services, which includes the community health worker network (volunteer collaborators), had a high diagnostic efficiency, whereas active surveillance continues to show a low diagnostic efficiency and high operational cost. Efforts continue to be made to improve microscopic diagnosis at the referral level of the general health services, through training of laboratory technicians in malaria diagnosis and redeployment of trained microscopists. In countries where

Table 3. Comparison Between Passive and Active Case Detection, 1999

Countries and territories by geographic subregion	PASSIVE CASE DETECTION						ACTIVE CASE DETECTION		
	General health services and hospitals			Volunteer collaborators			Epidemiologic investigations and follow-ups		
	Blood slides			Blood slides			Blood slides		
	Examined	Positive	SPR	Examined	Positive	SPR	Examined	Positive	SPR
Mexico	636,867	1,961	0.31	325,406	2,458	0.76	1,051,472	1,983	0.19
Belize	...	...	...	...	...	...	...	...	...
Costa Rica	9,552	1,396	14.61	6,625	427	6.45	80,277	2,175	2.71
El Salvador	62,659	402	0.64	73,780	802	1.09	8,329	26	0.31
Guatemala*	44,528	6,306	14.16	127,345	31,874	25.03	7,198	1,993	27.69
Honduras	-	-	-	237,074	46,740	19.72	-	-	-
Nicaragua	339,082	19,485	5.75	216,478	19,191	8.87	-	-	-
Panama	28,420	258	0.91	249	6	2.41	132,550	672	0.51
Dominican Rep.	52,030	811	1.56	16,720	323	1.93	384,070	2,445	0.64
Haiti [^]
French Guiana	34,562	4,936	14.28	...	...	...	13,412	371	2.77
Guyana	18,341	1,860	10.14	20,879	2,012	9.64	216,007	23,411	10.84
Suriname	65,087	13,939	21.42	...	...	...	...	...	...
Brazil	...	...	...	...	...	...	...	...	...
Bolivia	97,427	33,115	33.99	31,409	9,867	31.41	30,782	7,055	22.92
Colombia	268,355	66,845	24.91	-	-	-	-	-	-
Ecuador	395,493	79,280	20.05	49,113	8,201	16.70	-	-	-
Peru	1,789,990	166,579	9.31	-	-	-	237,634	0	0.00
Venezuela	71,441	10,830	15.16	-	-	-	147,548	8,256	5.60
Argentina	1,404	120	8.55	111	24	21.62	7,009	78	1.11
Paraguay	11,112	2,174	19.56	42,877	5,415	12.63	47,085	2,356	5.00
T O T A L	3,926,350	410,297	10.45	1,148,066	127,340	11.09	2,363,373	50,821	2.15

--- Not applicable

... No Information available

* GUT 4,925 cases not differentiated

[^] Haiti: Partial information only

SPR = Slide Positivity Rate (%)

P. falciparum resistance is prevalent, the use of rapid diagnostic tests is becoming increasingly common as a measure to assure adequate treatment in areas that are hard to reach.

Considerable conceptual and operational changes are required for successful implementation of the GMCS to ensure that measurable impact is achieved. While these changes take place as an integral part of the health sector reform process in the Region, implementation of the GMCS has provided a major opportunity to strengthen local health services capacity and to expand coverage.

3. Major Problems and Constraints

There are three major barriers to the implementation of a successful malaria control strategy. The first is the institutional resistance to change resulting from the deep-rooted idea that malaria control is achieved through insecticide spraying, which can only be accomplished by a major operational institution.

The second barrier is the lack of trained human resources capable of ensuring the implementation of effective vector control/vector interception measures to follow up and complement the successful prevention of mortality and reduction of morbidity in a decentralized health sector.

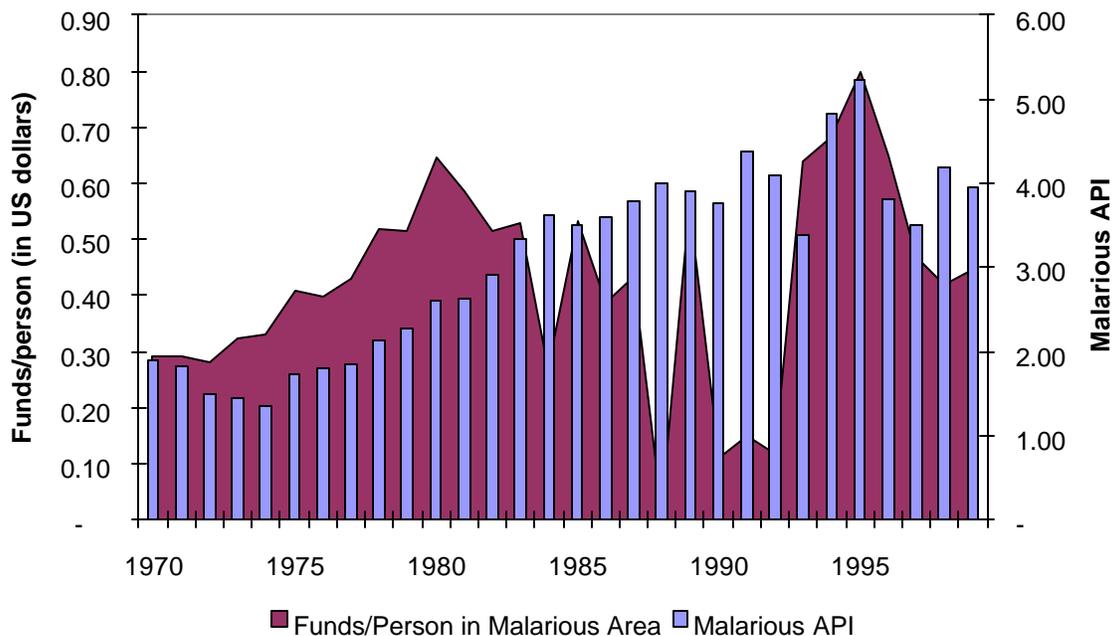
The third major constraint is the drastic reduction in central budgets and the effective application of the available resources, concomitant with the major administrative process of decentralization of health services.

Figure 4 shows that the funds utilized by the control programs have varied greatly over the last five years. However, expenditure per person in malarious areas has been very low for the 16 countries that reported their budget for malaria control to PAHO.

On the socioeconomic side, GMCS implementation in the Region has shown an increase in the effectiveness of control measures in decreasing *P. falciparum* transmission and reducing the cost of its execution. An economic evaluation of GMCS implementation in the Region took place in Brazil and showed that the cost of traditional vector-based malaria control programs is more than double that of the GMCS for the same effectiveness achieved. The study assessed the cost of malaria control per Disability Adjusted Life Year (DALY) over an eight-year period. In the initial four years, malaria control was implemented under the traditional comprehensive vector control. These operations used 78.7% of the resources available for the period (US\$ 352,794,720), with only 21.3%

utilized in diagnosis and treatment operations. The second four-year period used \$160,588,742, of which 47.4% was used for epidemiologically targeted vector control operations and 52.6% was used to expand the coverage of diagnosis and treatment operations.

Figure 4: Funds/Person in Malarious Areas vs. Malarious API - 1970-1999



Both periods saved Brazil a similar total number of DALYs: 4,041,439 DALYs in the first four-year period and 4,730,948 DALYs in the second period. However, the cost per DALY saved was \$87.29 in the first period, while each DALY saved in the second period cost the country \$33.94.

In an effort to capitalize on these early results and reinforce the countries' capability to achieve greater measurable impact based on the principles of the GMCS, PAHO has joined the WHO global initiative "Roll Back Malaria."

4. The Roll Back Malaria Initiative

The Roll Back Malaria (RBM) Initiative is a social movement whose objective is to significantly reduce the global burden of malaria through the promotion of interventions adapted to local needs and through the reinforcement of the health sector.

The initiative brings the world's attention to the regions affected by malaria by promoting the mobilization of resources and intensifying the application of existing tools for malaria transmission control.

The Global Partnership to Roll Back Malaria is committed to enabling people to halve the burden they experience as a result of malaria by the year 2010 through these six elements:

- evidence-based decisions;
- early diagnosis and prompt treatment;
- well coordinated actions;
- multiple prevention;
- dynamic global movement;
- focused operational research.

RBM is a pathfinder for PAHO/WHO in developing initiatives directed at other health and development problems. As a coordinated approach to sustainable control of infectious diseases, RBM will develop and sustain the necessary intersectoral collaboration between the health and other sectors to meet the needs of rolling back malaria.

RBM encourages evidence-based strategies, community-level action and effective joint action between governments and development agencies. It recognizes that sustained success in rolling back malaria inevitably calls for the development of health sectors so that they can address a range of priority health problems. It seeks to mainstream efforts to roll back malaria throughout the range of community-level health activities being undertaken by societies at risk of malaria. RBM is expected to mobilize households and communities and other partners for appropriate action.

PAHO/WHO will provide strategic support to a functioning partnership with a range of organizations at the global, regional, and country levels, that results in developing a sustained capacity to address malaria and other health priorities. At the country level, RBM will support the creation of coalitions for action and assist countries in building and supporting community-level partnerships that engage multiple partners and all providers of health care for malaria. Technical cooperation support is at the core of the RBM approach.

Now that progress is being made and fewer people are dying from malaria in the Americas, there is an important and urgent political demand for transmission control. It is necessary to keep in mind that morbidity and mortality rates are heavily influenced by cases of malaria and other communicable diseases originating in impoverished areas and particularly in areas inhabited by indigenous populations.

The methods proposed by PAHO/WHO are: (1) an integrated vector control called Selective Control of Malaria Vectors (SCMV) and (2) the Plan for Simultaneous and Intensive Activities (PAIS). These are new and simplified techniques: the integrated vector control for local-level workers and the Mexican PAIS place the emphasis on the simultaneity of actions to reduce human and vector reservoirs.

PAIS can be a good approach and a cost-effective solution if it is developed and applied together with early diagnosis and immediate treatment. The SCMV is based on the need to use selective tools, chosen for each specific situation. In other words, these tools must be developed according to each region's specificity, and they should be effective, low cost, and affordable, to allow a sustainable decrease of vector transmission.

In addition to the transfer of adequate financial and material resources and trained personnel from the malaria programs, a major challenge for health managers is to have regular and timely information at the local level to facilitate their priority-setting and decision-making. To do so, local health services will have to make more use of the methods available to observe and monitor the health condition of the population and the environment.

5. Conclusions

The present situation of GMCS in the Americas requires an intensified effort to overcome the detected barriers to its implementation. The GMCS implementation is tremendously complex and calls for:

- changing from the traditional approach characteristic of vertical organizations and programs;
- organizing health services in areas of difficult access;
- preparing human resources for the effective implementation and sustainability of the adopted measures;

- providing adequate financial and material resources in quantity and on time.

The challenge is even greater in a decentralized health system context. Only joint commitment and collaboration of all interested partners can achieve this goal. The Roll Back Malaria initiative provides a mechanism to do this and it is essential for the Americas.

Annex



PAN AMERICAN HEALTH ORGANIZATION
WORLD HEALTH ORGANIZATION



126th SESSION OF THE EXECUTIVE COMMITTEE

Washington, D.C., 26-30 June 2000

CD42/16 (Eng.)
Annex

RESOLUTION

CE126.R19

ROLL BACK MALARIA IN THE REGION OF THE AMERICAS

THE 126th SESSION OF THE EXECUTIVE COMMITTEE,

Having considered Document CE126/18, which proposes that the Member States in which malaria is a public health problem join the *Roll Back Malaria* initiative spearheaded by the World Health Organization,

RESOLVES:

To recommend that the Directing Council adopt a resolution in the following terms:

THE 42nd DIRECTING COUNCIL,

Having considered Document CD42/___ which proposes that the Member States in which malaria continues to be a public health problem adopt the *Roll Back Malaria* initiative in their territory; and

Taking into account that this initiative, in addition to being consistent with the goal of promoting local health systems and services, encourages joint efforts to remove obstacles to the implementation of effective malaria control through the strategic lines of action of coordinated resource use, the establishment of a malaria drug policy, and the training of human resources to carry out the measures to control malaria transmission,

RESOLVES:

1. To urge the Member States to:
 - (a) formalize the adoption of the *Roll Back Malaria* initiative in territories where malaria still constitutes a public health problem;
 - (b) make a commitment to perform an annual evaluation of progress in the different areas of the initiative, until malaria is eliminated as a public health problem in the Region.
2. To request the Director to:
 - (a) continue to support the mechanisms for monitoring the progress of prevention and control programs;
 - (b) support the efforts aimed at mobilizing the necessary resources for the elimination of malaria in the Region.

(Seventh meeting, 29 June 2000)