Mem. Inst. Oswaldo Cruz, Rio de Janeiro, Vol. 81, Suppl. II :39-41, 1986. *Intern. Symp. on Malaria*

COMMENTS ON THE EPIDEMIOLOGY AND CONTROL OF MALARIA IN BRAZIL

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Since 1970 the number of cases of malaria has increased in Brazil, despite the efforts for the control of the disease. The increase has been both absolute and relative, considering the population growth. In 1970, the Superintendency of Public Health Campaigns (SUCAM), an agency in the Ministry of Health, recorded about 52,000 people with malaria parasites in blood smears and an annual parasite index (API) of 1.3 per one thousand inhabitants. In 1985 about 400,000 positive blood slides were recorded and the API was 6.9 (Table I).

It is true that there has been a reduction in size of the transmission area. More than 99% of the patients acquired malaria in the so-called Legal Amazon Region, in the last year. This region includes the Northern Region, part of the Central-Western Region and the State of Maranhão, which belongs to the Northeastern Region. At present, about 14.9 million people live in the Amazon, which occupies about 5 million square kilometers, more than 60% of the whole country **(Map).**

Map. 1: Brazil, showing states within the legal Amazon Region.

Malaria incidence is not homogeneous in the Amazon Region. On the contrary, it is focused in places where a lot of migrants are settled in poor housing conditions. Among the 453 municipalities in the region, 78 (17.2%) registered 81.5% of all the malaria cases in 1985. The area of these municipalities corresponds to 35.6% of the whole Amazon Region, and its population, to 29%. Table II, with the proportion of malaria cases in each State of the Amazon Region in 1984, points out to the importance of the States of Rondônia and Pará, which together account for more than 3/4 of all cases.

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TABLE I
Yearly number of malaria cases in Brazil, 1970-1985

Year	No. of cases, in thousands
1970	52
1971	75
1972	81
1973	71
1974	63
1975	87
1976	85
1977	98
1978	115
1979	144
1980	169
1981	197
1982	222
1983	297
1984	376
1985	399

TABLE II
The proportion of malaria cases in the Amazon Region, by States, in 1984

State	% of malaria cases
Rondônia	41.6
Pará	35.4
Maranhão	6.7
Roraima	4.3
Acre	3.2
Mato Grosso	2.9
Amazonas	2.3
Amapá	1.9
Goiás	1.7

In areas where transmission is very high there are special conditions for this fact, besides those found in the whole region throughout the year, i.e., high temperature, humidity and rainfall. *Anopheles darlingi*, the main vector in the region, reaches high densities in almost any endemic area and the plasmodia in the mosquitoes attain the infective stage within a short time. The special conditions are related to social and economic factors — the actual causes for the increasing incidence of malaria. The concentration of migrants living in poor conditions is the very important factor. A large proportion of the houses are huts, partially or almost totally without walls. This fact increases the vector-man contact and reduces the effectiveness of DDT spraying as a prophylactic measure. The majority of the migrants come from regions of Brazil where malaria does not occur or has ceased to be a health problem since long ago. So, they are non-immune, and the cases tend to be more severe mainly in the first contacts with the disease. Finally, the presence of *Plasmodium falciparum* strains resistant to the 4-amino-quinoleines and also to the association sulpha plus pyrimethamine lessens the efficiency of the efforts to eliminate the parasites.

With so many handicaps, a program of malaria control has few chances of being efficient unless prophylactic measures related to environmental management are undertaken. For example, the construction of suitable houses far from the breeding places of the mosquito vectors, elimination of these breeding places whenever possible, keeping the streams or rivers free from obstruction by trunks and branches of trees, the use of mosquito nets. These measures must be implemented by private enterprises or governmental agencies responsible for the development projects which attract workers in a great number, such as the building of roads, highways or hydroelectric plants, mining activities, agriculture or cattle farms, etc. All these prophylactic measures, when applied together and in the early days of the projects, could prevent the appearance of malaria epidemics. Many recent examples of the value of such measures can be mentioned. In the present construction of the hydroelectric plant of Balbina, in the State of Amazonas, in the deep jungle, the former recommendations have been followed and malaria is not a problem (Chagas et al., 1982). The construction of the railway Carajás-Itaiquí, in the States of Pará and Maranhão and the paving of the highway Cuiabá-Porto Velho, in the States of Mato Grosso and Rondônia, were concluded before the expected dates, despite the fact that they both crossed some very receptive areas for malaria. The incidence of the disease was low and did not prevent the development of the projects.

But, unfortunately, in many other projects, such as the building of the hydroelectric of Tucuruí (Pará State), the mining explorations in Itaituba (Pará State) and in the Madeira River (Rondônia State), the majority of the colonization projects undertaken by the "Instituto Nacional de Colonização e Reforma Agrária" (INCRA), prophylactic measures were not applied and malaria was, and is, a very important problem, despite the specific efforts by the health agency responsible for the control program (SUCAM).

In conclusion, malaria is an important disease in Brazil, but its natural transmission is almost restricted to the Amazon Region. In this region it is closely related to the disorganized process of colonization. Its prevention and control do not depend only on activities of the health sector, but requires the involvement of private enterprises and governmental agencies responsible

for the economic development projects in the Amazon Basin. Even without the introduction of new preventive measures, as a vaccine, it is possible to reduce drastically malaria incidence by using prophylactic measures related to environmental management associated with specific health measures against the disease, such as systematic treatment of all patients and an anti-Anopheles campaign.

REFERENCE

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