

ROUND TABLE 9 - SUMMARY

CRITICAL ANALYSIS OF MALARIA CONTROL MEASURES IN BRAZIL

Chairman: *Pedro Luiz Tauil**
Co-Chairman: *José T. Fiuza Lima***

This round table includes presentations on several aspects of malaria control in Brazil.

Dr Fazito, from National Foundation of Health of the Ministry of Health, presented the current plan for malaria control in Brazil, making a distinction between these control measures and those of the old eradication program. In the later, uniform measures were emphasized of periodic application of residual insecticide inside all buildings in endemic zones and the distribution of anti-malarial drugs to the feverish individuals, independently of the specific characteristics of transmission of each locality. In the new control program there is a need for knowing the local epidemiological characteristics and choosing which, among the available antimalarial measures, are more adequate for the local situation. This emphasis requires the organization of a decentralized program and the capacity of persons to analyse the transmission situation, with authority to apply the antimalarial measures appropriate to the different situations.

Dr Bernardino de Albuquerque, from the Institute of Tropical Medicine of Manaus, AM, spoke about the determinant factors of the present malaria situation in the Amazon caused by the radical ecological, socioeconomic and cultural changes which have occurred in this region.

The implementation of the project for integrating the Amazon with the rest of the country promoted heavy migration to this region. The events responsible for this phenomenon were: the construction of a highway network (Belém-Brasília, Transamazônica, Cuiabá-Porto Velho, Perimetral Norte); the consolidation of

the Amazon as a new area of agricultural settlement, acting to reduce social pressures generated in other traditional agricultural regions, trying to increase production without land reform and, finally the discovery of big mineral reserves by the RADAM project in 1975.

The population in the 1970's presented a relative increase of 62% against 38% in the period comprised between 1960 and 1970. The state of Rondônia had the most significant population increase in the 1970's (333% against 59% in the previous decade).

The disordered migration had an impact on malaria transmission, except in some priority areas. The number of cases in the North Region increased from 20,172 in 1970 to 442,579 in 1990. There are different epidemiological situations with particular transmission profile where each situation possesses its own factors.

In order to be effective the control must be related to the reality of each situation, searching for the most adequate intervention measures.

Meanwhile, it was shown that malaria control has an area of political interest. The maintenance of the present endemic levels seems to play an important role in the process of deterioration and reproduction of the small producer, the mining prospector, the indians, the caboclo population, etc. In reality this is a less explicit form to facilitate the incorporation of lands, minerals, etc., in the Amazon region by the large capital concerns.

Dr Jose Maria de Souza, from the Federal University of Pará analyzed the critical aspects of malaria therapy, which is an important intervention measure for disease control. The appearance of *Plasmodium falciparum* resistant strains to the 4-aminoquinolines led to difficulties for malaria control in Brazil. The introduc-

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tion of new drugs for use in the field has to be carefully carried out due to their greater toxicity. The monitoring of *P. falciparum* resistance in the Amazon region, coordinated by Dr De Souza has shown that in the field the use of chloroquine for *P. falciparum* malaria still reduces severity and mortality, because R-III resistance is not frequent. Several types of drug associations have been shown to be useful for infections by *P. falciparum* resistant to 4-aminoquinolines treatment, among them the quinine-tetracycline association has been demonstrated to be effective and to reduce the side effects of quinine. Undoubtedly, mefloquine is very useful in the cases of *P. falciparum* resistant strains. The experience with artemisine and halofantrine is still very limited in Brazil. Several studies of the efficacy and side effects of these drugs are in a preliminary phase, including those of multicentric nature.

Dr Jose Fiuza Lima, analyzed the use of DDT in malaria control in Brazil. He showed a marked decrease in DDT consumption by the malaria program, in the last 30 years, with a reduction of the annual spraying. Notwithstanding this reduction, it seems that in the short and medium term DDT as has been used in malaria control - inside the houses - will still be the insecticide of choice in Brazil. This choice is in consequence of its low toxicity for humans, its low environmental contamination, the lack of resistance of the main vectors in relation to the possible insecticides available in the market. Finally it presents the best cost/benefit relationship. Furthermore, this use of DDT is quite different to its use in agriculture - prohibited in Brazil - due to the risks for human health and environmental contamination. Unfortunately, environmental groups do not always analyze these points and are radically contrary to the use of DDT, even when it is used in malaria control.

In any case, the program of malaria control in Brazil has been looking for the utilization of other control measures against the disease, such as basic sanitation in urban and periurban areas and the amplification of laboratories for early diagnosis and adequate treatment of human malaria cases. Moreover, the malaria control program supports investigations about the efficacy of alternative insecticides, since in the long term DDT should be replaced.

Dr Pedro Tauil talked about some aspects related to intersectorial activities in malaria

control in Brazil. Malaria incidence is influenced by biological, environmental, social and economic aspects. The distribution of the disease in Brazil in the last years was analyzed, it was shown that it is concentrated in the Amazon region, within this region it is concentrated in certain municipalities and in these municipalities in certain districts. What characterizes these localities with high malaria incidence is the populational movement, with the migrants living in precarious conditions of dwelling and work. This migration is determined by the search of better survival conditions, either in mining, colonization projects or in other type of economic projects. He stressed some aspects on this subject of Dr B. Albuquerque's talk.

The experience of the malaria control program in Brazil has show that where and when multisectorial articulation is obtained, the efficiency of the control measures is greater. The involvement of other sectors responsible for populational movement, such as financial, electric energy, barrage, highways, railroads and civil construction, permit the health sector to appropriately apply the traditional control measures and to obtain much more favorable results. Several examples have already been mentioned: construction of the Balbina hydroelectric dam (Amazonas), the construction of Carajas and Itaiqui railroads (Pará), paving of the Cuiabá-Porto Velho road, areas of mechanical mining and even goldfields where the government controls gold exploration as in Serra Pelada. In these examples, malaria was not a health problem, the disease being controlled without making these projects inviable or delaying their execution.

The multisectorial approach basically consists of acquiring, from other sectors of society, the support that hinders transmission such as building houses with walls, reduction of breeding places etc. and which facilitates control. This can be obtained with the implementation of an epidemiological surveillance system with early diagnosis and treatment of cases, transport facilities for health staff in applying insecticides inside the houses, decrease of breeding places and sanitary education in order to reduce man-vector contact. The difficulty to obtain this multisectorial collaboration is well recognized, however currently public and private enterprises in the Amazon region, already admit to the economical advantages in cooperating with the health sector in their projects.

There only remains the areas where there is no political priority for malaria control; among them the open goldfields and the areas in the initial phase of spontaneous colonization.

Dr Benjamin Gilbert spoke about the perspectives for the production of antimalarial drugs in Brazil.

There appears to be no chemical manufacture of antimalarial drugs in Brazil. Technology at the laboratory process level has been developed for chloroquine, mefloquine, pyrimethamine and cycloguanil, but not perfected nor scaled-up, largely for economical reasons and market uncertainty. Development of primaquine has been contracted but will run into the same difficulties. Manufacturing capacity for sulfadoxine has been registered in the SDI by Roche. A project to produce artemisinin and its derivatives is under way at UNICAMP-CPQBA but is hampered by the low content in the plant. Proguanil could be produced rapidly, but apparently no attempt has been made to do so. Quinine is imported on a large scale mostly for soft drink production.

Since malarial treatment falls largely within the responsibility of the Government health authorities, manufacture of drugs in Brazil depends on assured medium-term purchase order made to a potential local manufacturer, since competition in the world market is scarcely viable at the present moment.

Dr Mercia Arruda presented the results of her investigations in relation to the similarities between *Plasmodium brazilianum* (of monkeys) and *Plasmodium malariae*. The first species could be a strain of the second one adapted to monkeys, since the repetitive sequence of the circumsporozoite protein (CS) is the same for both *Plasmodium*. This fact introduces again the possibility of an eventual animal reservoir of human malaria. On the other hand, the question was raised about *P. malariae* diagnosis in thick blood smears. It was pointed out that *P. malariae* malaria could be misdiagnosed due to the erroneous identification of the plasmodial species.

In summary, the combat against malaria in Brazil is going through a process of review of methods and strategy. The implementation of operational processes adequate for control and not for eradication programs, are facing behavioral and institutional resistance. The priorities in disease control are still not well established in all transmission areas. The social and economical aspects in determining the high transmission levels need to be considered better in order to intensify the efficacy of control. During this round table, some other aspects were also emphasized such as: the monitoring of *P. falciparum* resistance to routinely used antimalarial drugs, the study of unusual epidemiological factors on malaria transmission in the Amazon region as well as the guaranty of the government to supply, with antimalarial drugs, the national market.