

High Prevalence of Asymptomatic Malaria in Gold Mining Areas in Brazil

SIR—The Amazon River Basin accounts for 99% of the 0.6 million cases of malaria reported annually in Brazil and for 50% of all cases in the Americas. *Plasmodium vivax* infections represent about 58% of the cases, followed by *Plasmodium falciparum* (41% of cases) and *Plasmodium malariae* (1.0% of cases). In the last two decades, the prevalence of malaria in Brazil has increased dramatically as a consequence of colonization and deforestation, particularly in gold mining areas (most reported cases are from these areas). There is a high frequency of malaria transmission among gold miners; their mobility and poor compliance with prescribed antimalarial agents have contributed to the rapid emergence of *P. falciparum* resistance [1]. The limited access to gold mining areas, the high mobility of the mining population, and the steady increase in drug-resistant *Plasmodium* species have been a challenge to malaria control programs in Latin America. Asymptomatic malaria is common in areas of high endemicity such as Africa and Southeast Asia [2]; in contrast, asymptomatic malaria has been considered uncommon in Latin America [3]. We report herein a large proportion of cases of asymptomatic malaria in the Brazilian Amazon River Basin and discuss the implications of this finding for malarial control and research.

We are collecting baseline data for use in field trials of interventions against malaria in the rural municipality of Peixoto de Azevedo in central Brazil. This community is typical of many such sites scattered throughout the Amazon forest and serves as a base for several gold mining camps in the area. Blood samples were collected from 98 gold miners who lived in one of these camps during the dry season. Examination of thick blood smears prepared from these samples revealed plasmodium asexual forms in 20 (20.5%) of 98 cases. Seventy percent of the infected

individuals were asymptomatic and did not develop fever during the 48 hours after the plasmodia were discovered. Fever was more common among those infected with *P. falciparum* (5 of 10 miners) than among those infected with *P. vivax* (1 of 8) or *P. malariae* (0 of 2). In addition, 6 of 78 miners who did not have parasitemia reported fever.

The large proportion of cases of asymptomatic malaria disclosed in this study represents a challenge to the current strategy for control of malaria in Brazil, as this strategy has been based on early detection and treatment of symptomatic cases. These alluvial gold mining sites are important reservoirs of drug-resistant *P. falciparum* and other parasites; thus, other individuals (e.g., Indians, farmers, and loggers) who live in these mining areas are at risk for malaria. To design intervention strategies for controlling transmission of malaria in different ecoregions in the Amazon River Basin, further studies are required to assess the extent and role of asymptomatic malaria in relation to the population's immunologic status, levels of parasitemia, the species of parasite, and previous episodes of malaria and antimalarial treatment. This information is also essential for evaluating new tools for malarial control based on protecting individuals (e.g., with vaccines and bed nets).

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