

PCR detection of *Plasmodium knowlesi* in blood collected from people along the border between Lao P.D.R. and Vietnam

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In Savannakhet, Laos and Quang Tri, Vietnam, most malaria cases are found in the mountainous, forested border areas. Despite substantial control activities by both governmental control agencies, malaria is still an important health problem. The objective of this study was to obtain a better understanding of the malaria situation along this border for improving cooperation in border malaria control between Laos and Vietnam. Fourteen villages in Savannakhet and 22 villages in Quang Tri were randomly selected within 5 km from the border where a blood survey for microscopic diagnosis (n = 1256 and n = 1803, respectively) was conducted between August and October 2010. After microscopic examination, the samples were also subjected to PCR analysis to precisely know what parasite species transmitting in the study area. Results showed malaria prevalence was significantly higher in Laos (5.2%) than in Vietnam (1.8%) ($p < 0.001$). The proportion of *P. vivax* (50.8% in Laos, 42.0% in Vietnam) was higher than is typically found in the nationwide records of both countries. Results of PCR showed besides human malaria parasites, *P. falciparum*, *P. vivax* and *P. malariae*, the existence of *P. knowlesi* on both the sides. All *P. knowlesi* infections were co-infections with human malaria parasites, with *P. vivax* in Vietnam, while mainly with *P. falciparum* and *P. vivax* in Laos. *P. knowlesi* infected children under 15 years old on both sides. The results suggest that both human malaria and *P. knowlesi* were more prevalent in Laos than in Vietnam because the villages in Laos are closer to the forest. This is the first report of natural human infections with *P. knowlesi* in Laos, which probably originate from monkeys living in forest and transmitted by the here abundant *Anopheles dirus* mosquitoes to humans.