

CHRONICLE OF MALARIA EPIDEMICS IN THAILAND, 1980-2000

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Abstract. The occurrence of malaria epidemics in Thailand was reviewed from the malaria surveillance report of the National Malaria Control Program. The literature review revealed that the four epidemic periods recorded during 1980-2000 almost always occurred in the provinces and districts located along international borders. Malaria epidemics are caused by various factors such as: extensive population movement, multi-drug resistance development, low immune status of the population, lack of knowledge and appropriate personal protection against mosquito biting, and the re-emergence of malaria transmission in low malarious areas. Such factors can lead to changes in the parasite ratio and appearance of malaria epidemics throughout the country. Evidence related to the burden of malaria epidemics was also reviewed to identify causal factors that will be helpful in future research.

INTRODUCTION

A malaria epidemic can be described as a periodic or occasional sharp increase in the amount of malaria in a given indigenous community. The various determinants of malaria epidemics complicate their definition. Therefore, communities that are not normally exposed to high rates of malaria transmission are vulnerable to explosive epidemics that can cause high case fatality rates among all age groups (Worrall *et al*, 2004). Epidemics may be less obvious when increased transmission occurs against a trend of higher numbers of malaria cases. Epidemics can also occur when people who have low immunity enter malaria prone areas or endemic regions as migrants and refugees (Kiszewski *et al*, 2004).

This review presented the chronicle of malaria epidemics in Thailand during 1980-2000 which occurred in various parts of the country. Monthly malaria cases were collected from the surveillance system of the Thai Malaria Control Program. Evidence relating to the burden of malaria epidemics was then reviewed to identify causal factors that will be useful for future research.

THE DISTRIBUTION OF MALARIA EPIDEMIC OCCURRENCE

Malaria case detection in Thailand at present is carried out mainly by malaria clinics, malaria volunteers and the existing health infrastructure in

various areas. In the forest areas, where there was a high volume of population movements, treatment was provided by malaria staff. However, it was generally difficult to treat patients for radical cure and case investigation due to their occupational activities and migratory habits. Malaria Division (1999) reported that there were malaria epidemics in Thailand during 1980-2000 as follows:

- 1980-1984 Epidemics in provinces along the Thai-Lao and Thai-Cambodia borders
- 1986-1987 Epidemic in the southern provinces
- 1988-1997 Epidemic in Thai-Cambodia border
- 1998-2000 Epidemic in Surat Thani, Yala, Nakhon Si Thammarat, Krabi Provinces and spreading throughout the southern provinces of Thailand

MALARIA EPIDEMIC IN PROVINCES ALONG THE THAI-LAO AND THAI-CAMBODIA BORDERS DURING 1980-1984

Provinces along the Thai-Lao border were mostly classified into non-transmission areas but still have high risk for malaria transmission because a suitable environment and vector are still present. Since 1979, a large number of Khmers (Cambodian people) have migrated from inside Cambodia to the Thai-Cambodia and Thai-Lao borders as a result of political conflicts within their country (Fig 1 and 2). By 1982 and 1983, fighting was the major cause of several movements from Cambodia to areas with different malaria transmission potential in Thailand - namely Nakhon Phanom, Ubon Ratchathani, Surin, Si Sa Ket, Buri Ram, Prachinburi, Chanthaburi and Trat Provinces. Thus, a lot of severe morbidity was found in low transmission areas because people had no immunity or lost their protective immunity (Meek, 1988).

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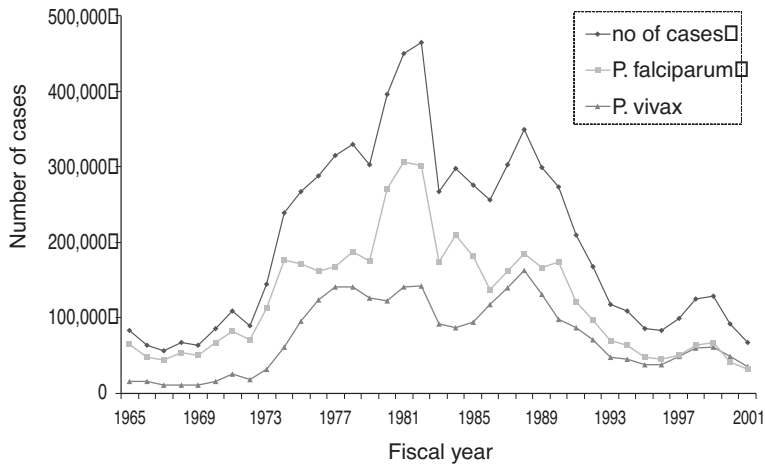


Fig 1- Thai malaria cases reported and parasite species, 1965-2001 (Bureau of Vector Borne Disease, 2003).

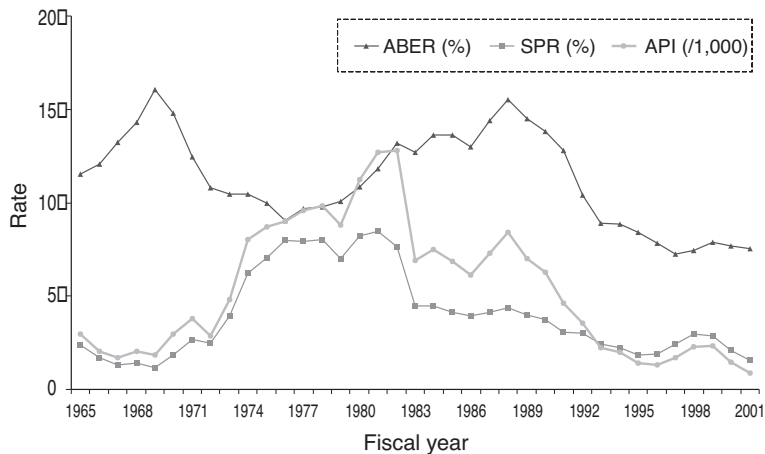


Fig 2- Annual Parasite Incidence (API), Annual Blood Examination Rate (ABER) and Slide Positive Rate (SPR) of Thai cases, Thailand, 1965-2001 (Bureau of Vector Borne Disease, 2003).

MALARIA EPIDEMICS IN CHUMPHON, SURAT THANI, RANONG AND KRABI PROVINCES DURING 1986-1987

Epidemiological evidence supported that malaria incidence in 1987 increased from 5.0 per 1,000 population in 1986 to 6.3 in 1987 (or 28%), especially in the southern peninsula where *P. vivax* is predominant (65%). Cases continued to increase in 1988 due to the population movement to coffee and rubber plantations, changes in the environment and new settlements. The group of provinces in the South in which epidemics occurred in 1987 showed a 12-fold increase in malaria cases from 1986. Most of these cases were due to *P. vivax* and the most affected provinces were Surat Thani,

Krabi, Ranong and Chumphon (Ketrangsee *et al*, 1991).

During 1985 to 1987, the number of cases increased in the areas with coffee plantations among the four provinces mentioned above. Investigation of the malaria epidemic in 1986-1987 revealed that in 1986 the price of coffee increased substantially (about 100%), and many forested areas were cleared for coffee plantations. People employed for forest clearance for coffee plantations contracted malaria in the newly cultivated tracts. As a result of active transmission in the plantation area, epidemic situations started to increase in 1986 and the highest peak was found in 1987 (Suvannadabba, 1991).

MALARIA EPIDEMIC IN THAI-CAMBODIA BORDER DURING 1988-1997

Epidemic in Bo Rai district, Trat Province, 1988-1992

The malaria epidemic in Bo Rai district was caused by thousands of gem miners moving across the border into (and returning from) Cambodia. Estimates showed that malaria clinics in the district encountered about 5-7% of the returnees (Kondrachin, 1986). About 50% of gem miners came from the surrounding areas of Chanthaburi and 25%, from Tak Province on the western border. Within the Tak group of migrants, besides Thai people, there were Burmese, Karen and Mon tribals, representing a clear mode of transport for *P. falciparum* from Cambodia to Myanmar and probably beyond. The situation further deteriorated due to a reduction in the cure rate (about 55%) of treatment with the combination of mefloquine-sulfadoxine – pyrimethamine (MSP) (Rooney and Thimasarn, 1991). The malaria situation in Bo Rai district during 1978 to 2000 was shown in Fig 3.

Thailand also had an epidemic of *P. falciparum* among gem miners returning from Cambodia. The epidemic commenced in late 1988 and ended in 1995 and took place in Bo Rai district, Trat Province, eastern Thailand, close to the Pailin gem mining area in Cambodia. These areas were well known to be an epicenter of multidrug resistant falciparum strains. Moreover, documentary evidence revealed that there was rapid development of mefloquine resistance at the Thai-Cambodia border (Bo Rai) due to the uncontrolled falciparum malaria epidemic among gem miners who crossed the border to Pailin in Cambodia and returned to Thailand (Thimasarn *et al*, 1995).

Epidemic in Pa Rai sub-district, Aranyaprathet, Sa Kaeo Province, 1996-1997

There was a malaria outbreak in Sa Kaeo Province, located near the Thai-Cambodia border. Malaria cases suddenly increased in Sa Kaeo Province from 1,066 (in 1996) to 4,381 (in 1997) and the parasite species had changed from predominantly *P. falciparum* to *P. vivax*. There were several reasons for the malaria outbreak in Sa Kaeo Province, such as greatly increased movement of people between Thailand and Cambodia into areas susceptible to transmission. These migrations were coupled with drastically reduced use of residual insecticide spraying, low coverage of substitute measures (insecticide impregnated bed nets) and less intensified efforts on disease surveillance, which led to the malaria outbreak on the Thai-Cambodia border in 1997 (Ketkaew *et al*, 1998). However, these factors could not explain the changing pattern of dominant malaria species from *P. falciparum* to *P. vivax*. Possible explanations could be the impact of the new antimalarial drugs (Artesunate) on falciparum malaria and changing sensitivity of *P. vivax* to chloroquine in the area.

MALARIA EPIDEMIC IN THE SOUTHERN PART OF THAILAND NAMELY SURAT THANI, YALA, NAKHON SI THAMMARAT, KRABI PROVINCES, 1998-2000.

Since 1998, the southern peninsula had malaria cases increasing from 8,725 cases in 1996 to 13,623 in 1997 and 47,149 in 1998. The proportion of *P. falciparum* increased from 45% in 1996 to 56% during epidemics (Malaria Division, 1999). Meanwhile, there was re-emergence of malaria transmission in many

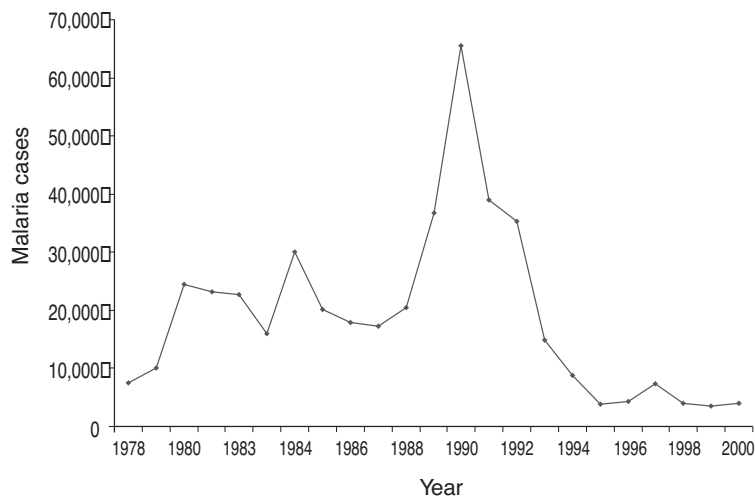


Fig 3- Epidemic malaria in Bo Rai district, Trat Province (Bureau of Vector Borne Disease, 2003).

districts where transmission had ceased in Phuket Province. Although malaria transmission had been eradicated for years, there were seven confirmed indigenous cases reported in 1998. All patients contracted the infections in hilly forested areas where migrant laborers were employed. However, the transmission took place outside tourism areas.

CONCLUSION

Malaria epidemics over the past two decades always occurred along the Thai-Cambodia and Thai-Malaysia borders whereas in the Thai-Myanmar border, high malaria cases were recorded but only a few epidemic situations were found. The provinces and districts located near the international border, especially the Thai-Myanmar border, mostly were perennial transmission areas where malaria case reports remained high throughout the year. However, routine data collection, reporting, and post-epidemic assessment activities must be strengthened and expanded to generate data on the burden of epidemics. In order to develop capacity for solving operational problems, especially along the international border and to deal with geographical characteristics related to malaria, research on these following topics may be worthwhile: dynamics of malaria transmission in southern, western and eastern Thailand, epidemiology of drug resistance in Thailand, and early warning systems to predict malaria outbreaks in low malaria areas. Innovative techniques such as early detection modeling will be necessary to establish an epidemic detection system. Research studies dedicated to monitoring malaria epidemics are needed, particularly in the border provinces.

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