Chapter 2

Literature Review

2.1 Effect of Population Mobility on Malaria

Anchalee Sighanetra –Renard (1986) Studied in – sights into the complex relationships between socioeconomic characteristics of places with high incidence of malaria, the mobility behavior of people living in those places and their implications for the transmission and control of malaria in northern Thailand. She found that remote and upland forests and border settlements are the most important factor of place. Mobility behavior is close to economic activities, such as forest and mining industry, trader, laborers of refugees who are moving back and forth across the borders and some other illegal activities. Since control measures designed for general population are not effective among highly mobile populations, especially for illegal movement. Then, She suggests that control programs should be targeted at high-risk groups in ways that are appropriate for their socioeconomic activities, culture and geographic.

Fernando (cited by Singhanetra-Renard ,1984) found that human population movement closely associate with transmission of tropical disease. In Southeast Asian movement have been reported to be major factor in malaria transmission.

As Prothero M. R. (1965) pointed out that migrant labor bring fresh malaria infections and thus built up and maintained the reservoirs of malaria transmission when their return each year from working and passing though malaria's areas. The more localized movement that take place during the dry season make it difficult to local people for administering various anti-malaria

measures. Even in the unsettled conditions of the past in Africa. There were always people who were prepared to face different and dangers in return for economic gain. In addition to agriculture development there has also been a wide – spread and in some instances, large scale exploitation of minerals.

Wang et at. (1994) surveyed some mobile population who left for Myanmar border areas. 5,286 blood smear were read and 1,028 of them were positive. Further, the study indicated that the malaria incidence directly close with the length of stay in Myanmar. The incidence rates of those who stayed in Myanmar for 1, 2, 3 days or more were 6.3 % (13 / 206), 18.2% (10 / 55), and 31.03% (9/29), respectively.

Hu Hong (1998) studied the factors influencing malaria endemic in Yunnan province by mapping through geographical Information System (GIS) with multiple regression analysis, She showed us that the combined effects of physical environment, the presence of efficient vector species and mobile population along international borders with Myanmar, Lao, PDR, and Vietnam is the mainly factors. She pointed out that a border county will have an extra higher malaria incidence rate of 6.51 per ten thousand population when it was compared to a county which does not share the border line with the three foreign countries.

2.2 Economic Study of Malaria Control

Ettling et al (1994) carried out a survey related to malaria knowledge, attitudes and practices (KAP) in Malawi in 1992. She found that household income level would effect expenditure on malaria prevention. Very low income households spend less resources on malaria prevention. It is 4% of income spending

Mills (1993) conducted a cost-effectiveness study of the vertically organized malaria control program in Nepal to assess the value of malaria control. Although it is concluded that the Nepalese program appears no less cost – effective than many other health priority in developing country. She point out the malaria control is well worthwhile, especially if the magnitude and nature of control efforts are related to the level of risk.

Kamol-Ratanakul et al (1993) carried out a field trail in migrant workers to compare the economic impact of permthrin-treated net with that of untreated net as a method of malaria control for migrant workers in eastern Thailand. During the thirty five weeks of observation, 23 worker using treated net and 33 workers using untreated net developed malaria with 28 and 51 episodes respectively (P=0.0029). From provider perspective, the net benefit of using a treated net was US $ 1.17 per worker and US $ 1.61 per worker form consumer perspective. He came to conclusion that Impregnated – net program was cost – saving as well as offering improved effectiveness. It likely is the most cost – effective and cost – benefit method for controlling malaria in eastern Thailand.

2.3 Allocation Efficiency and Equity

Pornchaiwiseskul (1993) has done an economic analysis of communicable disease control . He developed a framework which explain the effects of disease control on health risk and economic output and shown the relation as follows :

$$\text{Log } C_t - \text{Log } C_{t-1} = \eta_t - \rho_t \qquad\qquad (1 3 1)$$

C_t = the morbidity rate at year

η_t = the transmission rate

ρ_t = the patient recovery rate .

Three basic components in determining the disease-specific morbidity and mortality rate are I) the transmission rate, II) the patient recovery rate and III) the patient death rate. All three components can be controlled or influenced by the disease control measuring. Base on the main theoretical idea. A model of morbidity rates was specified.

$$\Delta Log\ C_{kt} = \alpha_{io} + \alpha_{i1}{}^{*}MORB1_{k,t-1} + \alpha_{i2}{}^{*}MORB2_{k,t-1} +$$

$$\alpha_{i3}{}^{*}MORB3_{k,t-1} + \alpha_{i4}{}^{*}\log Q_{k,t-1} + \alpha_{i5}{}^{*}RVAG_{kt} +$$

$$\alpha_{i6}{}^{*}HC_{kt} + \alpha_{i7}{}^{*}FORDEN_{kt} + \alpha_{i8}{}^{*}DDT_{kt} +$$

$$\alpha_{i9}{}^{*}ABER_{rt} + \alpha_{i10}{}^{*}ABER_{k,t-1}$$

$$\alpha_{i8}, \alpha_{i9}, \alpha_{i10} <= 0$$

$$\alpha_{i7} = \alpha_{i9} = \alpha_{i10} = 0, i = 2, 3$$

K = subscript index for cross section

t = subscript index for year

I = sets of diseases and causes of illness and death (=1, 2 , 3), 1 = malaria , 2 = acute diarrhea , 3 = tuberculosis

$MORB_{ikt}$ = annual disease -specific morbidity rate

DDT = amount of DDT use per population per year as a proxy for malaria preventive measure

ABER = Annual bleed examination rate .

RVAG = Ratio of the agriculture sector output to total economic as

a proxy for rural   population proportion .

FORDEN   =Forest density of proportion of forest land

Q   =Per capita output measured in real terms

HC   = No . of health center

He found that a lagged surveillance measures and DDT spraying will contribute negatively to malaria transmission.

A Log-linear model was fitted to explain the effects of health risk among different disease on economic output by employing marginal effects of different malaria control measures. Then, allocation efficiency and equity of malaria control were analyzed among health districts and each measure of control. Based on economic theory, he present the optimal condition of distribution to evaluate the efficiency and equity overtime and among health districts by making use of coefficient result from the developed model. Following the indication from analysis, allocating health resource in such a way that the national lifetime social welfare is maximized, thus, overall allocation efficiency can be touched.

Wu Weiping (1997) studied allocation efficiency and equity of malaria control in Yunnan province, China. He try to determined the relationship between malaria incidence rate and some malaria control activities, environmental factors, and social economic factors. In his study, the result shows that mobile population effect on malaria transmission in Yunnan. Moreover, the two measures, the preventive medicine (That is , chemoprophylaxis) and mosquito control activities have negative effects on malaria transmission in Yunnan. Other factors such as rainfall, temperature, and proportion of farmer population have positive effect on malaria incidence rate of Yunnan. They also play roles on influencing malaria transmission in Yunnan. There was not showed the evidence of GCP per capita associated with malaria transmission. Surveillance and anti-relapse therapy

measures did not show the evidence of relationship with malaria incidence rate in Yunnan. After based on the coefficient of regress analysis he analyze the allocation efficiency and equity by employing the marginal effect, he drew a conclusion that the more resources should be invested in mosquito control activities and southeast and south west region need more resources in term of allocation efficiency and equity analysis.