

Research Title Mathematical Model of Malaria Transmission :
Surat Thani Province

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ABSTRACT

This study aimed to 1) survey and compare the abundance of *Anopheles* mosquitoes in foothills forest and seaside 2) study the knowledge, attitude and behavior of people in Surat Thani Province 3) develop mathematical model of malaria transmission 4) study physical and biological factors which effect to malaria transmission and create malaria transmission map in Surat Thani Province.

The researcher studied the knowledge attitude and behavior of people in Surat Thani Province in 13 high incidence rate districts which were selected by using multi-stages sampling during October 2011 to September 2012 by using questionnaire, developed mathematical model of malaria transmission which take into account of the use of mosquito repellent as a control measure for the spread of malaria and a standard dynamical modeling method was applied for analysis the dynamical Malaria model and studied physical and biological factors which effect to malaria transmission and used Geographic information system to create malaria transmission map.

The research findings were as follows:

1. From the survey, the most density of primary vector in foothills forest was 1.646 and the most density of primary vector in seaside area was 0.813. The geography survey showed that The foothills forest area had the abundance and density of *Anopheles* mosquitoes more than seaside area.

2. The studying of the knowledge, attitude and behavior of people in Surat Thani province showed that the respondents had moderate level of knowledge, attitude and behavior. Statistical analysis showed that the geography had correlate with behavior of malaria prevention. The demographic characteristics: sex, occupation had

correlate with behavior of malaria prevention. The attitude had correlate with behavior of malaria prevention in the same direction.

3. In our model, we taked into account of the use of mosquito repellent as a control measure for the spread of malaria. The conditions for disease free and endemic state were found which depended on the basic reproductive number. The disease free equilibrium point was local asymptotically stable when changed the mosquito repellent rate ($P=0.9$) so infectious populations was decreased and the basic reproductive number to be $R_0 = 0.53356 < 1$ that mean the disease will die out. The endemic equilibrium was local asymptotically stable when changed the mosquito repellent rate ($P=0.01$) so infectious populations was increased and the basic reproductive number to be $R_0 = 1.67881208 > 1$ that mean there would be Malaria outbreak. It was found that the use of mosquito repellent significantly reduce transmission and infection of this disease.

4. Assessment of malaria risk areas revealed that 45.87% of the total areas were non – transmission area and 7.09% of the total areas were perennial transmission area from physical factors. 16.48% of the total areas were at high risk from biological factors.