ECONOMIC ANALYSIS OF MALARIA CONTROL IN THE BORDER AREA OF YUNNAN , CHINA

MR. ZHOU SHENG

A Thesis Submitted in Partial Fulfillment of the Requirements
for the Degree of Master of Science in Health Economics
Department of Economics
Graduate school
Chulalongkorn University
Academic Year 1998

ISBN: 974-332-574-3

I19307809

Thesis Title	:	ECONOMIC ANALYSIS OF MALARIA CONTROL IN THE BORDER AREA OF YUNNAN, CHINA
By	:	Zhou Sheng
Program	:	Health Economics
Thesis Advisor	:	Asst. Prof. Dr. Pongsa Pornchaiwiseskul, Ph. D

Accepted by the Graduate School , Chulalongkorn University in Partial Fulfillment of the Requirements for the Degree of Marster of Science.

.....Dean of Graduate School

(Prof. Supawat Chutivongse , M.D.)

Thesis Committee:

.....Chairman

(Phitsanes Jessadachatr, Ph. D.)

.....Thesis Advisor

(Asst. Prof. Pongsa Pornchaiwiseskul, Ph. D.)

.....Member

(Assoc. Prof. Manisri Puntularp)

.....Member

(Asst. Prof. Chanetwallop N. Khumthong)

411279

4185741629: MAJOR HEALTH ECONOMICS
KEY WORD: ECONOMIC ANALYSIS / MALARIA CONTROL / POPULATION MOBILITY
ZHOU SHENG: ECONOMIC ANALYSIS OF MALARIA CONTROL IN THE BORDER AREA OF YUNNAN, CHINA. THESIS ADVISOR: ASST. PROF. PONGSA PONCHAIWISESKUL, Ph. D. 71 pp. ISBN 974-332-574-3.

This study is aimed to identify the role of population mobility on malaria transmission in the international border areas of Yunnan in order that the resource allocation can be analyzed by using spillover effect from population mobility. It mainly consists of two parts. The first part is model building, in which panel data of 48 counties in Yunnan and neighboring countries during 1994-1997 were employed. After weighting the effect from neighbors by length of boundary between two sides, the effect of crossing border movement was analyzed using regression technique. The result showed that mobile population is an important factor influencing malaria transmission in the border counties of Yunnan. Surveillance and vector control was not found to have statistically significant effect on malaria transmission in the border areas.

The second part is resource allocation analysis. Based on the coefficients of population mobility from different sides, spillover effect of mobile population was analyzed so that we can suggest a border resource allocation in malaria control under such a circumstance. The study showed us that the malaria transmission was effected by the combination of boundary line and malaria severity in neighboring country. Some border counties of Yunnan are facing higher risk from increased crossing border movement compared to others. It suggests that allocating more resource in a higher risk county will lead to more efficiency in resource allocation

ภาควิชา Economics ลายมือชื่อนิสิต Zhou Sheng

สาขาวิชา Health Economics ลายมือชื่ออาจารย์ที่ปรึกษา Pongsa

ปีการศึกษา 1998 ลายมือชื่ออาจารย์ที่ปรึกษาร่วม

Acknowledgment

I would like to thanks Dr. Pongsa, Pornchaiwiseskul, my advisor, for his kind guidance and invaluable time devoted to my thesis. Without his help, I can not finish my thesis on time.

I also would like to thanks Dr. Phitsanes Jessadachatr, the chairman of committee, Assoc. Prof. Manisri Puntularp, member of committee, and Asst. Prof. Chanetwallop N. Khumthong, member of committee for their kindly help and useful suggestion.

I also would like to thanks Dr. Chev, Kindson for his enormous help in my thesis.

Special thanks must go to TDR, which give me one year fellowship of studying and living in Bangkok.

I am also grateful for the helps from Dr. Stephen, King, Dr. Hu Hong, Dr. Cho Min-Niang and my Vietnamese friends.

My thanks is extended to my government. my institute. Director Yang Huang , Director Zhang Zaixing, other directors and my colleagues for the permission of my leaven to study in Thailand and fully support.

Last. but not least. I must express my thanks to all who love me and help me.

Zhou Sheng ,

April. 1999

Contents

Abstract ii

Acknowledgment iii

Content iv

List of Tables vi

List of Figures viii

List of Abbreviation ix

Chapter 1 Background and Rational

1.1 Introduction of Malaria Situation 1

1.2 Basic Information for Yunnan Province 3

1.3 Malaria Situation among the Three Neighbors 5

1.4 Border Crossing Movement 6

1.5 Malaria Reporting System 6

1.6 Research Question 9

1.7 Research Objective 9

1.8 Expected Benefits 9

Chapter 2 Literature Review

2.1 Effect of Population Mobility on Malaria 10

2.2 Economic Study of Malaria Control 11

2.3 Allocation Efficiency and Equity 12

Chapter 3 Methodology

3.1 Research Design 16

3.2 Conceptual Framework 16

3.3 Indicator and Determination of Malaria Control 17

3.4 Malaria situation in Neighboring Countries 19

3.5 Border Crossing Movement.....19
3.6 Regression Analysis.....21
3.6.1 Malaria Control in Yunnan.....22
3.6.2 Regression Model.....26
3.6.3 Analysis of Model.....27
3.7 Analysis of Resource Allocation of Malaria Control.....29
3.8 Data Collection.....34
3.8.1 Data Available in Case Reporting System.....35
3.8.2 Data Available in the Statistics Yearbooks.....36
3.8.3 Other Data Resources.....36

Chapter 4 Result and Discussion

4.1 Regression Analysis.....38
4.1.1 Effect on Border Counties from Foreign Countries.....38
4.1.2 Effect on Border Counties from Neighboring Counties in Inland.....39
4.1.3 Vector Control.....40
4.1.4 Surveillance.....41
4.1.5 Lagged Malaria Incidence.....43
4.1.6 Conclusion of Regress Analysis.....43
4.2 Analysis of Other Factors.....43
4.3 Analysis of Resource Allocation.....48

Chapter 5 Conclusions

5.1 The Conclusion of This Study.....55
5.2 Recommendation.....56
5.3 Limitation of The Study.....57
Reference.....58
Appendices.....61

Curriculum vitae.....71

List of tables

Table 1.1 The Malaria Situation in the Border Areas of Yunnan Province during 1992-1997 4

Table 3.2 The Resource of Data 34

Table 3.3 The Definition of Variables of the Study 36

Table 4.1 The Result of Regress Analysis 39

Table 4.2 Comparison of Malaria Situation in the Border Country of Yunnan China 45

Table 4.3 Comparison of Intensity Effect From Foreign Country and Inland County 47

Table 4.4 The Spillover Effect of Mobile Population in Each County of Yunnan 49

Table 4.5 Composition of Spillover Effect from Different Mobile Population on Malaria Transmission in Yunnan 52

Appendix Table A.1 The Data of Regression Analysis 62

List of figures

Figure 1 Malaria Situation in Yunnan during 1992-1997 5

Figure 2 Malaria Case Reporting System in Yunnan, China 8

Figure 3 Conceptual Framework 18

Figure 4 The Relationship of Malaria Transmission among Neighbors 22

Figure 5 Chart of Regress Analysis 27

List of Abbreviation

ACD	Active Case Detection
A-E & P	Anti-epidemic and preventive station
CAPM	China Academy of Preventive Medicine
Dx	Diagnosis
INCF	Malaria incidence in foreign country weighted by boundary line
INCNEI	Malaria incidence in inland county weighted by boundary line
L_x	Length of boundary line with county X or country X
MDA	Mass Drug Administration
MPH	Ministry of public health
PCD	Passive Case Detection
P.f.	Plasmodium falciparum
PTx	Presumptive treatment
P.v.	Plasmodium vivax
RTx	Radical treatment
SUR	Surveillance
Tx	Treatment
VECT	percentage of population covered by DDT spraying in total population as proxy of vector control
YIMC	Yunnan Institute of Malaria Control