

Contents

	Page
Abstract	iv
Acknowledgments	v
Contents	vi
List of Table	viii
List of Figures	ix
Chapter	
1. Introduction	
1.1 Background	1
1.2 Objectives and study design	6
1.3 Disease definitions	7
1.4 Literature Review	9
2. Methodology	
2.1 Management of Data	11
2.2 Methods used for the Quantitative Analysis	12
2.3 Methods for Creating Geographical Maps	14
3. Preliminary Data Analysis	
3.1 Distribution of Incidence Rates	16
3.2 Correlations between Disease Rates	18
3.3 Map Comparisons	20
4. Statistical Mapping of Morbidity	
4.1 Statistical modelling	26
4.2 Alert maps of disease incidence	33

	Page
5. Conclusion and Discussion	
5.1 Conclusion	36
5.2 Discussion	38
5.3 Limitations and Future Research	40
References	41
Appendix	45
Vitae	50

List of Tables

Table	Page
1.1 Disease cases in Yala Province 1999-2003	6
4.1 Average incidence rates/1000 of diseases in Yala subdistricts	27
4.2 Estimated parameters in negative binomial model for disease incidences	30
4.3 Deviance from Poisson and negative binomial models	31
4.4 Alert levels based on p-values adjusted for multiplicity	34
5.1 Correlation between disease incidence rates	37

List of Figures

Figure	Page
1.1 World distribution of dengue, 2002	1
1.2 Altitude contour maps of Yala Province	3
1.3 Statistical subdistricts of Yala Province	4
1.4 Districts of Yala Province	5
3.1 Distribution of incidence rates of diseases in 2002 for Yala subdistricts	16
3.2 Distributions of log-transformed incidence rates	17
3.3 Scatterplot matrix showing correlations between DHF, dengue fever and diarrhoea, before (left panel) and after (right panel) log transformation	18
3.4 Scatterplot matrix showing correlations between malaria, pneumonia, haemorrhagic conjunctivitis, pyrexia and diarrhoea, after log transformation	19
3.5 Correlation Structure of Diseases	19
3.6 Range Map of the DHF from 2002 to 2003 in Yala Province	21
3.7 Range Map of the Dengue Fever from 2002 to 2003 in Yala Province	21
3.8 Range Map of haemorrhagic conjunctivitis from 2002 to 2003 in Yala	23
3.9 Range Map of Diarrhoea from 2002 to 2003 in Yala Province	23
3.10 Range Map of the Pneumonia from 2002 to 2003 in Yala Province	24
3.11 Range Map of Pyrexia from 2002 to 2003 in Yala Province	24
3.12 Range Map of the Malaria from 2002 to 2003 in Yala Province	25

Figure	Page
4.1 Normal scores plots of standardised residuals for four diseases in Yala	28
4.2 Normal scores plots of standardised residuals for three diseases in Yala	29
4.3 Gamma scores plots of standardised residuals for four diseases in Yala	32
4.4 Gamma scores plots of standardised residuals for three diseases in Yala	33
4.5 Alert maps of Dengue fever in 2002 and 2003	34
4.6 Alert maps of Pyrexia in 2002 and 2003	35