

Table of Contents

Table of Contents

Declaration	i
Executive Summary	iii
Acknowledgements.....	viii
Table of Contents.....	ix
List of abbreviations.....	xiii
List of Peers Review Publications Arising from this Thesis.....	xv
Chapter 1: Introduction.....	1
1.1. Background	3
1.2. Malaria epidemiology	4
1.2.1. <i>Etiology and life cycle of Malaria</i>	4
1.2.2. <i>Global malaria burden distribution</i>	6
1.2.3. <i>Malaria's socio-economic burden</i>	7
1.2.4. <i>Malaria risk factors</i>	8
1.3. Current strategies for malaria prevention, control and elimination	11
1.3.1. <i>Integrated Vector Management</i>	11
1.3.2. <i>Prompt Treatment of Malaria Clinical Cases</i>	11
1.3.3. <i>Malaria Chemoprophylaxis</i>	12
1.3.4. <i>High Burden High Impact (HBHI)</i>	13
1.3.5. <i>Malaria Vaccines and prospects</i>	13
1.4. Malaria surveillance system and its challenge	14
1.5. Added value of taking into account the spatio-temporal dimension in malaria surveillance: looking for an appropriate approach for a heterogeneous problem	16
1.6. Contribution of Bayesian approach: new developments of an old method to improve surveillance in the control of an old disease.....	16
1.7. Malaria during pregnancy	17
1.7.1. <i>Features of malaria during pregnancy</i>	17
1.7.2. <i>Symptoms and Complications of Malaria in Pregnancy</i>	18
1.7.3. <i>Asymptomatic malaria and anemia among pregnant women</i>	19
1.7.4. <i>Particularities of Malaria Diagnosis in Pregnancy</i>	20
1.7.5. <i>Monitoring Malaria in Pregnancy</i>	21

Table of Contents

1.7.6. <i>Pregnant women as a sentinel population for malaria surveillance</i>	21
1.8. Congenital and Neonatal Malaria	21
Chapter 2: Methodology in Context	23
2.1. Country profile and status of malaria in Burkina Faso	25
2.1.1. <i>Country profile</i>	25
2.1.2. <i>Status of malaria</i>	25
2.2. Data sources in the framework of the thesis	27
2.2.1. <i>Malaria case count and case fatality data</i>	27
2.2.2. <i>Data from periodic survey: Service availability and malaria readiness indicators data</i>	28
2.2.3. <i>Health program, meteorological and other open data sources</i>	28
2.3. Data quality of routinely collected data	29
2.4. Spatiotemporal modeling and applications in malaria surveillance	30
2.4.1. <i>Spatiotemporal modeling</i>	30
2.4.2. <i>Disease Mapping</i>	31
2.4.3. <i>Hierarchical Bayesian spatial modelling (HBSM)</i>	31
2.5. Rationale and objectives of the thesis	33
2.5.1. <i>Justification and rationale of the thesis</i>	33
2.5.2. <i>Objectives</i>	34
2.6. Organization of the thesis	35
Chapter 3 : Community health programs effect on spatiotemporal changes of malaria in pregnancy	37
3.1. Introduction	39
3.2. Methods	41
3.3. Results	46
3.4. Discussion	55
3.5. Conclusion	58
Chapter 4: Methodology for optimal estimation of health district readiness indicators	81
4.1. Introduction	84
4.2. Methods	85
4.3. Results	90
4.4. Discussion	97
4.5. Conclusions	98

Table of Contents

Chapter 5: Assessing health facility readiness effects on severe malaria in pregnancy & case fatality	109
5.1. Background	113
5.2. Methods	114
5.3. Results	120
5.4. Discussion	126
5.5. Conclusion.....	128
Chapter 6 : Addressing challenges in routine data reporting and early warning tool	139
6.1. Background	141
6.2. Methods	143
6.3. Results	150
6.4. Discussion	157
6.5. Conclusion.....	160
Chapter 7: General discussion.....	169
Chapter 8: Conclusion and Perspectives for research.....	177
Bibliography.....	183
Scientific Curriculum Vitae.....	207
Annexes.....	213
Annex A	215
Abstract.....	231