

**PREDICTING THE SEVERITY OF DENGUE FEVER AMONG
CHILDREN ADMITTED TO ANGKOR HOSPITAL FROM
CLINICAL FEATURES AND LABORATORY INDICATORS:
APPLICATION OF CLASSIFICATION TREE ANALYSIS**



KHANSOUDAPHONE PHAKHOUNTHONG

**A THEMATIC PAPER SUBMITTED IN PARTIAL
FULFILLMENT OF THE REQUIREMENTS FOR
THE DEGREE OF MASTER OF SCIENCE
(BIOMEDICAL AND HEALTH INFORMATICS)
FACULTY OF GRADUATE STUDIES
MAHIDOL UNIVERSITY**

2014

COPYRIGHT OF MAHIDOL UNIVERSITY

PREDICTING THE SEVERITY OF DENGUE FEVER AMONG CHILDREN ADMITTED TO ANGKOR HOSPITAL FROM CLINICAL FEATURES AND LABORATORY INDICATORS: APPLICATION OF CLASSIFICATION TREE ANALYSIS

KHANSOUDAPHONE PHAKHOUNTHONG 5538765 TMBI/M

M.Sc. (BIOMEDICAL AND HEALTH INFORMATICS)

THEMATIC PAPER ADVISORY COMMITTEE: WIRICHADA PAN-NGUM, Ph.D., STUART BLACKSELL, Ph.D., PIMWADEE CHAOVALIT, Ph.D., PODJANEE JITTAMALA, M.D.

ABSTRACT

Background: Dengue fever (DF) / Dengue Haemorrhagic Fever (DHF) is a viral and re-emerging disease, commonly occurring in tropical and subtropical areas. Furthermore, clinical features and laboratory abnormalities of dengue infection are also similar to other febrile illnesses. The goal of this study is to develop predictive models to characterize dengue and its severity by early clinical and laboratory measures using statistical and data mining tools.

Methods and findings: We performed a retrospective study and retrieved data from a study of febrile illness in children at Angkor Hospital for Children in Cambodia. A total of 1225 febrile episodes were in our analysis, 198 were confirmed dengue patients. Classification and regression tree (CART) and logistic regression analysis were used independently to differentiate: dengue versus non-dengue (model 1), severe dengue versus non-severe dengue (model 2) and death versus survival (model 3). Highlighting result of model 2, classifying severe dengue, the decision tree algorithm using pulse rate, hematocrit, Glasgow coma score, urine protein, creatinine and platelet count has outperformed the logistic regression model with sensitivity and specificity of 71% and 68.7%, respectively.

Conclusions: Our decision tree algorithm using simple clinical and laboratory indicators has a high classification accuracy in predicting pediatric patients who develop severe dengue. This model is potentially useful for guiding a patient monitoring plan and outpatient management of fever.

KEY WORDS: DENGUE SEVERE DENGUE / CLINICAL / LABORATORY / CLASSIFICATION AND REGRESSION TREE (CART)/ LOGISTIC REGRESSION

140 pages