**Distribution Agreement**

In presenting this thesis or dissertation as a partial fulfillment of the requirements for an advanced degree from Emory University, I hereby grant to Emory University and its agents the non-exclusive license to archive, make accessible, and display my thesis or dissertation in whole or in part in all forms of media, now or hereafter known, including display on the world wide web. I understand that I may select some access restrictions as part of the online submission of this thesis or dissertation. I retain all ownership rights to the copyright of the thesis or dissertation. I also retain the right to use in future works (such as articles or books) all or part of this thesis or dissertation.

Signature: Date:

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_

Shaoman Yin 4/18/2013

**Analyzing Durability and Efficacy of Long-lasting Insecticide-treated Bed Nets: A Longitudinal Monitoring Study at Western Kenya**

**By**

**Shaoman Yin**

**Degree to be awarded: MSPH**

**Department of Biostatistics and Bioinformatics**

**\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ [Thesis Advisor’s signature]**

**Tianwei Yu**

**\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ [Reader’s signature]**

**Zhengjie Chen**

**Analyzing Durability and Efficacy of Long-lasting Insecticide-treated Bed Nets: A Longitudinal Monitoring Study at Western Kenya**

**By**

**Shaoman Yin**

**B.S. Jilin University, 1998**

**M.S. Jilin University, 2001**

**Ph.D. Chinese Academy of Sciences, 2004**

**Thesis Committee Chair: Tianwei Yu, Ph.D**

An abstract of

A thesis submitted to the Faculty of the   
Rollins School of Public Health of Emory University

in partial fulfillment of the requirements for the degree of   
Master of Science in Public Health in Biostatistics

2013

**Abstract**

**Analyzing Durability and Efficacy of Long-lasting Insecticide-treated Bed Nets: A Longitudinal Monitoring Study at Western Kenya**

By Shaoman Yin

Malaria is a mosquito-borne disease caused by parasite infection. Long-lasting insecticide treated nets (LLIN) are becoming one of the primary malaria prevention strategies in many parts of sub Saharan Africa. However, the durability and efficacy of these nets in the field condition is not well known. To answer these questions, a mosquito bed net study with followed up surveys (rounds) has been carried out in Western Kenya to monitor physical conditions and maintenances of seven net brands. Here, we first performed descriptive summaries by bands and rounds in four aspects of the study: 1) net attrition and reasons of net loss; 2) physical integrity, such as net hole areas and counts; 3) net care and use, such as net wash, net use, and bed type; 4) side effects of net use. Next, general linear regression, logistic regression, Poisson regression and Negative Binomial regression were used to analyze associations of net hole areas or net hole counts with brands, rounds and practices of net use and care. Results show that net hole areas and net hole counts were significantly affected by net brands and time of collected rounds. Net hole counts were also significantly affected by net use conditions. LLIN brands Olyset and PermaNet2.0 may have a poor physical integrity compared to other brands. These results may have implications of understanding physical durability and efficacies of LLIN nets in the field conditions for malaria control and prevention.

**Analyzing Durability and Efficacy of Long-lasting Insecticide-treated Bed Nets: A Longitudinal Monitoring Study at Western Kenya**

**By**

**Shaoman Yin**

**B.S. Jilin University, 1998**

**M.S. Jilin University, 2001**

**Ph.D. Chinese Academy of Sciences, 2004**

**Thesis Committee Chair: Tianwei Yu, Ph.D**

A thesis submitted to the Faculty of the   
Rollins School of Public Health of Emory University

in partial fulfillment of the requirements for the degree of   
Master of Science in Public Health in Biostatistics

2013

**Tables of Contents**

**Introduction……………………………………………………………1**

**Methods………………………………………………………………..3**

**Results………………………………………………………………….6**

**Discussion……………………………………………………………..13**

**Reference……………………………………………………………...17**

**Figures and Tables……………………………………………………18**