

Geographical variation of factors affecting effectiveness of Long-Lasting Insecticidal Nets (LLINs) in Tanzania



Zawadi Mageni^{1,2}, Ubydul Haque³, Lena M. Lorenz², Sarah Moore^{1, 4}, Jason Moore^{1, 2}, Dennis Massue^{4,5}, Renata Mandike⁶, Karen Kramer⁶, William Kisinza⁵, Hans J. Overgaard⁷, Jo Lines²

¹Ifakara Health Institute, Bagamoyo, Tanzania; ²Department of Disease Control, London School of Hygiene and Tropical Medicine, London, UK; ³John Hopkins Bloomberg School of Public Health, Baltimore, USA; ⁴Swiss Tropical and Public Health Institute, Basel, Switzerland; ⁵National Institute for Medical Research, Muheza, Tanzania; ⁶National Malaria Control Program, Dar es Salaam, Tanzania; ⁷Department of Mathematical Sciences and Technology, Norwegian University of Life Sciences, Ås, Norway.

INTRODUCTION

The success of long lasting insecticidal nets (LLINs) as a strategy for malaria control is evident, as they provide both a physical and chemical barrier from mosquitoes. However, quick physical deterioration of nets, insecticide resistance in mosquitoes, and net ownership not equating net use are challenges that pose serious threats to the sustainability of this intervention. It is crucial that factors associated with net loss are identified and accounted for.

OBJECTIVES

Assess relationship between net durability and location-specific environmental, cultural, and other potential risk factors (i.e. determine spatial risk factors for variation in net durability).
Assess relationship between net attrition and malaria incidence.

METHODS

- Study designs:** Retrospective survey of nets distributed in 2009-2010 and prospective survey of three nets brands (Olyset®, Permanet®2.0, and Netprotect®) for 3 years.
- Project period:** 2013-2017.
- Location:** Eight districts in Tanzania chosen for their geographical and epidemiological diversity.
- Net durability parameters:** Attrition (presence /absence), bioefficacy, chemical residue, damage (physical integrity).
- Data collection:** Land use, land cover, demographics, socioeconomical data. Structured questionnaires on household bed net use and household characteristics. National health survey data. All data will be georeferenced and stored in a GIS database.
- Analysis:** Spatio-temporal analyses and modelling to explore relationships and identify factors influencing spatial variations in LLIN durability using hot spot analysis (Getis-Ord Gi* statistic), Ordinary Least Squares (OLS), Geographically Weighted Regression, and Bayesian modelling.

ANTICIPATED RESULTS

We hypothesize that there are geographic variations in net durability and factors associated with LLIN durability due to environmental, socio-economic and cultural diversity in Tanzania. By identifying these factors, decision makers may use the results to more effectively optimize procurement and product choice to achieve universal coverage of LLINs for malaria vector control.

