Abstract of Master's Thesis

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Thesis Title	Number of people sharing bed nets increases risk of *Plasmodium* infection for children in villages along Lake Victoria, Kenya		

Background: Long-lasting insecticide-treated nets (LLINs) significantly reduce malaria morbidity and mortality. As the goal of universal coverage has not been achieved yet, a bed net is often shared with three or more persons despite the World Health Organization (WHO) recommendation, one net for every two persons. However, little is known about the maximum number of persons that one LLIN can protect.

Objective: To reveal whether higher infection risk is associated with increasing the number of persons sharing bed nets.

Methods: Children under five years of age were tested for *Plasmodium falciparum* infection using polymerase chain reaction (PCR) in villages along Lake Victoria, Kenya. Survey workers collected data on number of persons sharing nets from household representatives in addition to information on number of rooms, family members and bet nets, age, gender, sleeping location (bed or floor), and socioeconomic status. Mosquito collection, measurement of the sizes of sleeping rooms and record of house location with Global Positioning System (GPS) were also performed. Logistic regression analyses were used to measure the impact of the number of persons sharing a net on PCR-positive prevalence among children.

Results: Of 366 children studied, 316 (86.3%) reportedly slept under a net the previous night. The number of persons sharing a net ranged from 1 to 5 (median=2). Simple logistic regression analyses revealed that seven variables were associated with the number of persons sharing a net with children: age, gender, bed net availability, sleeping location, socioeconomic status and spatial impacts (latitude and longitude). PCR-positive prevalence among children significantly increased with an increase in the number of persons sharing a net (adjusted OR=1.56, 95%CI: 1.19-2.10). Children using a net alone or with one other person had a significantly lower prevalence than non-users (adjusted OR=0.21, 95%CI: 0.07-0.60 for the former; adjusted OR=0.38, 95%CI: 0.18-0.81 for the latter). However, the difference was not statistically significant for children sharing a net with two and more persons (adjusted OR=0.73, 95%CI: 0.35-1.49 for children sharing a net with two persons; adjusted OR=0.92, 95%CI: 0.38-2.18 for children sharing a net with three and more). In addition, children sharing a net with two other persons had the lowest mean age.

Conclusion: The risk of *P. falciparum* infection increases among children with an increase in the number of persons sharing a net in the study area. The benefit of a LLIN use for reducing *Plasmodium* infection are expected when children sleeping under a net alone or with one other person. These results support the WHO recommendation.