**Presentation title:** Bayesian Joint Spatial Modelling of Anemia and Malaria in Guinea

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**Abstract**

In sub-Saharan Africa, anemia and malaria are the leading causes of morbidity and mortality among children under the age of five years. Guinea is one of the countries where the two diseases have devastating effects. Both of these diseases have been studied separately, but the two diseases exhibit inherent dependence between them, therefore, modelling them in isolation negates practical reality. This study aims at jointly estimating the spatial linear correlation between anemia and malaria, as well as to investigate the differences in contextual, socioeconomic and demographic factors affecting morbidity among children under five years in Guinea. Statistical approaches are used to handle modelling of binary outcomes with allowance for spatial components and joint responses. In particular, a latent model approach is proposed in the methodology to investigate the linear correlation between anemia and malaria allowing for spatial and non-spatial effects. All the parameters are estimated using Bayesian approach based on Markov chain Monte Carlo (MCMC) technique. According to the findings, 76.15% of children under the age of five years in Guinea were anemic, and 14.31% had malaria. Furthermore, the results showed that the child's malaria status is significantly associated with the place of residence, his/her age and ownership of television as an indicator of well-being. In terms of anemia in children, there was a significant association with age, mother's education level and ethnicity group of the household head. The Nzerekore region, had both high malaria and anemia prevalences in children under five years. The latent model results showed that there was weak positive correlation between anemia and malaria in Nzerekore and Boke regions. Based on the shared component model, there was a significant unobserved risk factor that both diseases share.

**Keywords**: Bayesian inference; spatial modelling; correlation; latent model; binary outcome