Bayesian Mapping of childhood health inequalities in Sub-Saharan Africa using Demographic and Health Survey data (DHS)

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The links between health, geographic location, environment and economic development need to be better understood if the problems associated with these issues that face developing countries are to be overcome. With a population of about 120 million people, Nigeria is the most populous country in Africa. Its under-five child mortality rate of 183 per 1000 is among the highest in the world. The large area covered by the country together with geographic, socio-economic and ethnic differences lead one to expect substantial spatial variation in disease. One contributory cause can be expected to be the country's oil industry and which has led to substantial environmental damage.

Historically, variations in prevalence of childhood disease have been related to household socio-economic factors (such as food, good sanitation, and health care) and assumed parametric regression models. By contrast, geographical associations with prevalence and nonlinear effects of some covariates have been neglected.

The first aim of this paper is to use household survey data (The 1999 and 2003 Nigeria Demographic and Health Surveys) to map the state-level variation of diarrhoea, fever, and cough prevalence among young children in Nigeria. The second aim is to use appropriate statistical techniques to explain differences across the states in the prevalence of childhood diseases using the household socio-economic characteristics that are observed in our data. This will draw on Bayesian geo-additive methods of spatial statistics, taking advantage of advances in Geographic Information Systems. The modelling of the structured and unstructured components is done jointly in one estimation procedure that thereby simultaneously identifies socioeconomic determinants, and the spatial effects that are not explained by these socioeconomic determinants. In this way, we will be able to identify regional or state patterns of morbidity that are either related to omitted socioeconomic variables that have a clear spatial pattern or point to spatial (possibly epidemiological or environmental) processes.