Geostatistical modelling of the relationship between microfilariae and antigenaemia prevalence of lymphatic filariasis infections

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Abstract

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Keywords: ...

1 Background

- Give background information in LF.

  For Jorge/Rachel to review.

- Define the diagnostic procedures: microfilariae counts and immunochromatographic test (ICT). Contrast advantages and disadvantages of both diagnostics.

- Define objective of the study: development of a geostatisitcal model for the diagnostics procedures. Briefly outline advantages of this over standard methods.

- Describe outline of the paper.

2 Bivariate geo-statistical modelling of microfilariae and antigenaemia prevalence

- Define the standard format of the data and define the problem in statistical language.

2.1 Semi-mechanistic modelling

- Summarize Irvine et al. (2016).
- Discuss density-dependence.
- Extend the Irvine model to a geostatistical model, with and without density-dependence.

2.2 Empirical modelling

- Describe existing geostatistical methods for bivariate modelling; e.g. Crainiceanu and Diggle (2008). Cite Benjamin's paper which is going to be submitted by the end of January, where the empirical approach is developed.
- Formulate a model for LF mapping that uses the two diagnostics.

3 Inference

- Define the likelihood function; you can do this by using a general notation that is valid for both the empirical and semi-mechanistic approach.
- Outline the Monte Carlo maximum likelihood approach.

4 Simulation study

- Define objective of the simulation study: understanding the impact of model misspecification on predictive inferences.
- Define scenarios (to discuss).
- Report and comment results.

5 Application: lymphatic filariasis mapping in West Africa

- Description of the data.
- Exploratory analysis (to discuss).

- Fitting of the two models. Report estimates and comment those.
- Predictions and comparison.

6 Discussion

- Summarize findings.
- Answer the question: what model should we use?
- Comment on limitations of the analysis.
- Can the work be extended? Can the methodology be applied to other diseases?