Project proposal MathSys MSc

Project title:
Modelling African sleeping sickness at different spatial scales using real-world data

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Project outline

Gambiense African sleeping sickness (human African trypanosomiasis, gHAT) is a neglected tropical disease (NTD) targeted for elimination of transmission by 2030. Historically there were over 50,000 cases of gHAT each year, but thanks to a variety of medical and vector interventions, there are now fewer than 1000 cases. To make predictions about the timeline to elimination it is important to ensure mechanistic mathematical models are appropriately fitted to available data. Some datasets have more information than others (e.g. information about age or gender) or span different time periods. Surprisingly, some information for larger spatial scales (e.g. a province) has details that smaller spatial scale data does not.

In this project the goal is to establish improved Bayesian algorithms for matching models to data of different types, including different spatial scales or varying epidemiological information. It is expected that initially this work would begin by adapting an MCMC algorithm and utilise data sets at large and smaller scales (province versus health zone in the Democratic Republic of Congo) to fit an existing deterministic model for gHAT. Validation approaches can also be employed and/or developed to examine the robustness of model predictions by comparing to alternative data sets or by using data censoring.

This project links to the HAT MEPP group in SBIDER (http://go.warwick.ac.uk/hatmepp) of which there are weekly group meetings. There is potential for this MSc project to continue as a PhD.

Please email Kat Rock or Simon Spencer for more project details.