Title of PhD project / theme	**Time series regression models for climate-sensitive infectious diseases**
Supervisory team	Masahiro Hashizume (NU) Rachel Lowe (LSHTM)
Brief description of project / theme	Time series regression has been developed and long used to evaluate the short-term impact of air pollution and meteorological factors on mortality or morbidity of non-communicable diseases. However, the application of time series regression in infectious disease modelling is less well explored and raises some new issues. For example, traditional time series regression generally assumes that the population at risk of the outcome under study is more or less constant. However, immunity to infectious diseases causes variation in the susceptible population. In addition, strong autocorrelations caused by disease transmission may cause biases for the effect estimates of climate factors. The aim of this PhD project is to develop time series regression models to investigate association between infectious disease transmission and climate factors, while considering these unique infectious disease characteristics. The primary disease focus will be vector-borne diseases, such as malaria or dengue. The student will use and extend statistical time-series approaches in combination with mathematical approaches such as "susceptible-infectious-recovered" (SIR) models, if necessary. The student will take advantage of rich existing surveillance datasets from several countries in the tropics. This project is expected to advance the state-of-the-art in time series regression models for infectious diseases and, ultimately, improve our understanding of the impact of climate variability and climate change on the global burden of infectious diseases.
Particular *prior* educational requirements for a student undertaking this project	Required MSc in epidemiology or medical statistics. Prior experience in data analysis particularly time series regression modelling is desirable, although not essential. Experience of using mathematical models and the statistical software R would also be beneficial.
Skills we expect a student to develop/acquire whilst pursuing this project	The student will learn to design and construct infectious disease transmission models and develop quantitative skills in data analysis and regression modelling.