Project Title: Increasing efficiency of Randomised Trials via Bayesian borrowing and prognostic covariates.

Academic Supervisors: Alex Lewin, Jonathan Bartlett

Department & Institution: London School of Hygiene and Tropical Medicine

Collaborative Organisation: AstraZeneca (Statistical Innovation Group)

Project Description:

Randomised clinical trials are considered to be the gold standard in research, since they eliminate many sources of systematic bias between comparison groups. However, they are expensive and time-consuming to carry out.

In order to maximise the benefit from trials, researchers increasingly try to combine the information from a new trial with information already gained from earlier trials. It can be especially beneficial to use the data from the placebo arm of previous trials to supplement the data in a new trial.

This PhD will consider two different ways of doing this. The first is Bayesian Borrowing, in which results from earlier trials are converted into informative priors on the parameters for the placebo arm in the current trial, which reduces the uncertainty on those parameters, increasing efficiency of the current analysis. The second is to adjust for a Prognostic Covariate, which is also estimated using a model based on the earlier trial.

The project will implement both methods, and compare results using synthetic data to investigate in which situations one or both of these methods can be used.

Candidate Requirements:

Ideally, applicants should have an excellent undergraduate degree (first or upper second) in mathematics, statistics or a related field and an MSc in statistics, medical statistics, health data science, or a related field, or equivalents for qualifications gained outside the UK.
UK and international students are eligible to apply. For eligibility criteria for the DTP please see: https://ubeldtp.ac.uk/esrc-studentships/.

Key References:

Schuler A, W. D. (2022). Increasing the efficiency of randomized trial estimates via linear adjustment for a prognostic score. The International Journal of Biostatistics, 329-356.
Viele K, B. S. (2014). Use of historical control data for assessing treatment effects in clinical trials, Pharmaceutical Statistics, 41-54.

Further details about the project may be obtained from:

For further details about the project, please contact Alex Lewin at LSHTM (alex.lewin@lshtm.ac.uk) or Darren Scott at AstraZeneca (darren.scott@astrazeneca.com).

Deadlines and how to apply:

Please complete the UBEL DTP co-funded and collaborative student application form in Survey Monkey (link here).
Deadline: