INFERENCE FOLLOWING SELECTION AND TESTING DESIGNS

Proposed Research

In combined phase II/III trials, several experimental treatments are compared to a control in the selection stage and the selected experimental treatment is then further compared to the control during the testing stage; for some recent work in this area, see Kimani, Todd and Stallard (2013). Since bias is introduced by treatment selection, estimation of the effect of the selected treatment raises a number of issues. For example, it is not clear how best to estimate the effect of the selected treatment based on the first-stage data, because a conditionally unbiased estimator does not exist (Cohen and Sackrowitz, 1989). However, such an estimator with uniformly minimum variance can be constructed at the end of the testing stage by combining the data from the two stages. The project will explore some of these issues and their implications for real clinical trials.

Beneficiaries and Impact

Until recently, the different phases of a clinical trial were conducted separately. This is inefficient, since such trials often take longer to complete than those which combine two phases. By combining two phases of a trial also leads to more flexibility in the design, since adjustments can be made at the end of the first phase depending on the data accumulated so far. Useful theoretical progress on estimation issues would help popularise these designs, which, in turn, would lead to patients receiving more promising treatments earlier.

Supervision and Interdisciplinarity

The principal supervisor will be Dr. D.S. Coad in the School of Mathematical Sciences. It is planned that the second supervisor will be someone in the Wolfson Institute of Preventive Medicine. Since Professor J. Cuzick has an interest in the project, he is a potential second supervisor. This supervisory arrangement will increase the Statistics and Data Analysis Group’s involvement with the School of Medicine and Dentistry, and consequently support the Life Sciences Initiative.

Since the proposed research involves both novel developments in statistical methodology and their application to real clinical trials, it is truly interdisciplinary.

References
