MEDICAL UNIVERSITY OF VIENNA

Wiener Biometrische Sektion
der Internationalen Biometrischen Gesellschaft
Region Österreich – Schweiz

Please join the Biometric Colloquium

STEPHEN SENN

University of Sheffield, UK,
University of St Andrews, UK
Medical University of Vienna, Austria

STANDARD ERRORS IN REPRESENTING FISHER'S VIEWS ON RANDOMISATION

April 28th, 2026 at 02:00 pm

Spitalgasse 23, Jugendstilhörsaal
Medical University of Vienna, 1090 Wien
Host: Martin Posch

Abstract:

One hundred years ago, RA Fisher proposed randomisation as a solution to a problem in designing trials in agriculture[1]. However, if curiosity impels a modern statistician to look up Fisher's anniversary paper, they may be in for a shock. Randomisation is usually presented as a device for eliminating bias in treatment estimates. Fisher does not start his paper by addressing this but opens as follows with another concern:

"The present position of the art of field experimentation is one of rather special interest. For more than fifteen years the attention of agriculturalists has been turned to the errors of field experiments…much ingenuity has been expended in devising plans for the proper arrangement of the plots; and not without result, for there can be no little doubt that the standard of accuracy has been materially, though very irregularly, raised…an estimate of field errors derived from any particular experiment may or may not be a valid estimate, and in actual field practice is usually not a valid estimate, of the averages or differences of averages of which it is required to estimate the error." (p503)

The units in agricultural experiments are plots in a field and yields from such plots cannot be regarded as independent but instead have a complex but poorly estimable spatial correlation. Medical statisticians such as myself, who are used to dealing with patients as the unit of experimentation may underestimate the formidable difficulties that such correlation structures present for the calculation of valid standard errors. It is the valid calculation of such standard errors that form the central concern of Fisher's 1926 paper and randomisation was proposed by him as a way of finessing the issue of the correlation structure.

In this talk I shall cover various issues addressed by Fisher in his 1926 paper and argue that it is an all-too-common standard error to concentrate on the value or otherwise of randomisation in calculating point estimates. We should be much more concerned with inference as a whole, which can be approximately satisfied by thinking not only of point estimates but also of standard errors. If time permits, I shall also consider some modern trends where ignoring uncertainty seems to be leading to danger.

Reference

Fisher, R. A. (1926). The arrangement of field experiments. Journal of the Ministry of Agriculture of Great Britain, 33(6), 503-513.