

Seminario Aleatorio

Sesión 296

Estimation of intervention and spatial spillover effects in cluster randomized trials

Karim Anaya

Department of Mathematical Science, University of Bath

Resumen

Standard analyses of cluster randomised trials (CRTs) assume between-cluster independence. This assumption is potentially violated in CRTs against infectious diseases, whose clusters are often defined geographically, potentially inducing spatial correlation and indirect effects. We describe analytic methodology for CRTs with count outcomes, taking such effects into account. We use spatial regression models with Gaussian random effects, where the individual outcomes have marginal distributions overdispersed with respect to the Poisson and the corresponding intervention effects have a marginal interpretation. The following two types of effect are distinguished and estimated: spillover dependence, which is cross-cluster correlation between individual outcomes; and spillover indirect effect, which is change in the intervention effect depending on the proximity of individuals to those in the intervention arm. The latter can be exerted on individuals in the control arm - contralateral - or in the intervention arm - ipsilateral. Orthogonal regression is used to avoid bias arising from collinearity, a phenomenon which has become known as spatial confounding. We also show that coefficients from models with a certain form of homoscedasticity can be interpreted simply as intervention effects. The standard intrinsic conditional autoregression (ICAR) model does not have this property, but we use a normalized version which does. In order to quantify the proximity of individuals in the intervention arm we use Tukey's half space depth. We fit the models in a Bayesian framework using integrated nested Laplace approximations (INLA), and illustrate the methodology using data from a pair-matched CRT done in Venezuela against the mosquito *Aedes aegypti*, which is a vector of dengue and Zika.

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El Seminario Aleatorio está destinado tanto a profesores como a estudiantes, por lo que el Departamento de Estadística agradece a los profesores que colaboren invitando a sus alumnos a estas sesiones.

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