

TITLE: A Bayesian hierarchical framework to evaluate policy effects through quasi-experimental designs in a longitudinal setting

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ABSTRACT: The use of quasi-experimental designs has proven popular to establish causal links. In the context of longitudinal data the Interrupted Time Series (ITS) design can be used to evaluate the effects of interventions. In an ITS study, a time series of a particular outcome of interest is “interrupted” by an intervention at a known point in time (e.g. smoking bans, changes in alcohol trading laws, etc.). Such methods have been extensively used in several research areas, most notably econometrics and more recently in epidemiology and in public health. In addition, ITS has been modified in several directions, to accommodate specific data requirements (for instance the presence of non-linear time trends or the need to adjust for controls).

In this talk I will present some recent work on the extension of the ITS to a Bayesian hierarchical framework, aiming to build a flexible, comprehensible and generalisable statistical modelling framework to evaluate the individual and cumulative impact of “shocks” (e.g. government policies or unpredictable events) on health outcomes over time and specifically when there is some dependency in space. I will then show two applications of this approach (i) to evaluate the effect of municipal waste incinerator openings on adverse birth outcomes in England and (ii) to evaluate the impact of two governmental policies on mental-ill health on the whole population and specifically on minoritized ethnic groups in England.

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