

Systematic conflict assessment in an evidence synthesis to estimate HIV prevalence in Poland

Anne Presanis, David Ohlssen, Kai Cui,
Magdalena Rosinska, Daniela De Angelis

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Bayesian evidence synthesis, where multiple independent data sources contribute to the likelihood, is becoming increasingly employed in various fields, including infectious disease epidemiology. Evidence synthesis methods are most useful for estimating quantities which can't be directly observed, but for which indirect evidence is available: for example, prevalence of undiagnosed HIV infection or the case-fatality risk for influenza. However, the use of multiple sources informing common parameters entails the potential for different datasets to provide conflicting or inconsistent inferences about the common parameters. The detection and measurement of such conflict is therefore a crucial step in the model criticism process. Cross-validators posterior predictive methods have previously been proposed for conflict assessment ("node-splitting") in graphical models. However, the systematic assessment of conflict, at multiple locations throughout a graphical model, provokes the multiple testing problem. We therefore present a framework for systematic conflict diagnostics, accounting for the multiple null hypothesis tests of no conflict. We illustrate the method through a synthesis to estimate HIV prevalence in Poland.