BAYESIAN NON-PARAMETRIC ESTIMATION OF DISEASE PREVALENCE AND DIAGNOSTIC TEST CHARACTERISTICS IN THE ABSENCE OF A GOLD STANDARD

Martin Ladouceur[1], Elham Rahme[1], Lawrence Joseph[1]

[1] *McGill University, Montréal, Canada*

Diagnostic tests results are often available on a continuous scale, and while dichotomizing the data into positive or negative results can be clinically useful, for statistical purposes, this often leads to a loss of information compared to an analysis on the original continuous scale. Most statistical techniques for continuous diagnostic test data assume a parametric (e.g. normal) family for the distribution of the continuous outcome within disease and non-disease groups, an often unverifiable distributional assumption. An additional complication in diagnostic test studies is the absence of a gold standard test. While various Bayesian nonparametric methods have appeared in the literature, the performance of these models in practice has not been extensively investigated. We therefore investigated Bayesian models using mixtures of Dirichlet processes ($G \sim DP(\alpha G_0)$), formed within a latent class model which accounts for the lack of a gold standard test. We assessed the performance of these models via simulation studies under various conditions. In particular, we study the effects of changing various prior parameters associated with Dirichlet processes, and compare our results to those that would be obtained from the standard normal models, both when the underlying distributions from which the data arise are in fact normal, as well as when they are not normal.