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BAYESIAN ANALYSIS OF A MULTI-PATHOGEN MODEL

Influenza and Respiratory Syncytial Virus are the leading etiologic agents of seasonal Acute Respiratory Infections (ARI). Medical doctors around the world typically gather weekly consultation reports of ARI. However, laboratory tests necessary for identification of the virus are not always conducted in clinical settings. A relevant problem is to infer the interaction of Influenza and RSV from aggregated ARI data. In this work we consider a particle MCMC method to perform Bayesian inference on the kinetic parameters of a multi-pathogen epidemic model. Each iteration of the scheme requires an estimate of the marginal likelihood from the output of a sequential Monte Carlo Scheme (known as a particle filter). We use linear noise approximation (LNA) to estimate this marginal likelihood and use hierarchical model to tell apart each disease from the aggregated data. We have used ARI data, and Influenza and RSV records from a sentinel program at a central hospital, from San Luis Potosi, Mexico to test our method.