

Supplementary Material of “Approximate Bayesian Computation for epidemiological models: Application to the Cuban HIV-AIDS epidemic with contact-tracing and unobserved infectious population”

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The Supplementary Material contains 3 figures. Figure 1 and 2 display the boxplots of the 200 estimated modes, medians, 2.5% and 97.5% quantiles of the posterior distribution for λ_2 , the random screening detection rate, and λ_3 , the contact tracing detection rate, as a function of the tolerance rate. Figure 3 displays the Posterior Predictive Distributions (PPD) of $R_{21.5}^1$, $R_{21.5}^2$, I_6 , and the mean sojourn time in the class I. The PPD have been generated after having fitted a SIR model with a mass action principle for the detection rate (see equation (2.1) of the paper). Parameter inference has been performed with the smooth rejection ABC algorithm using the 2 statistics R^1 and R^2 as the summary statistics.

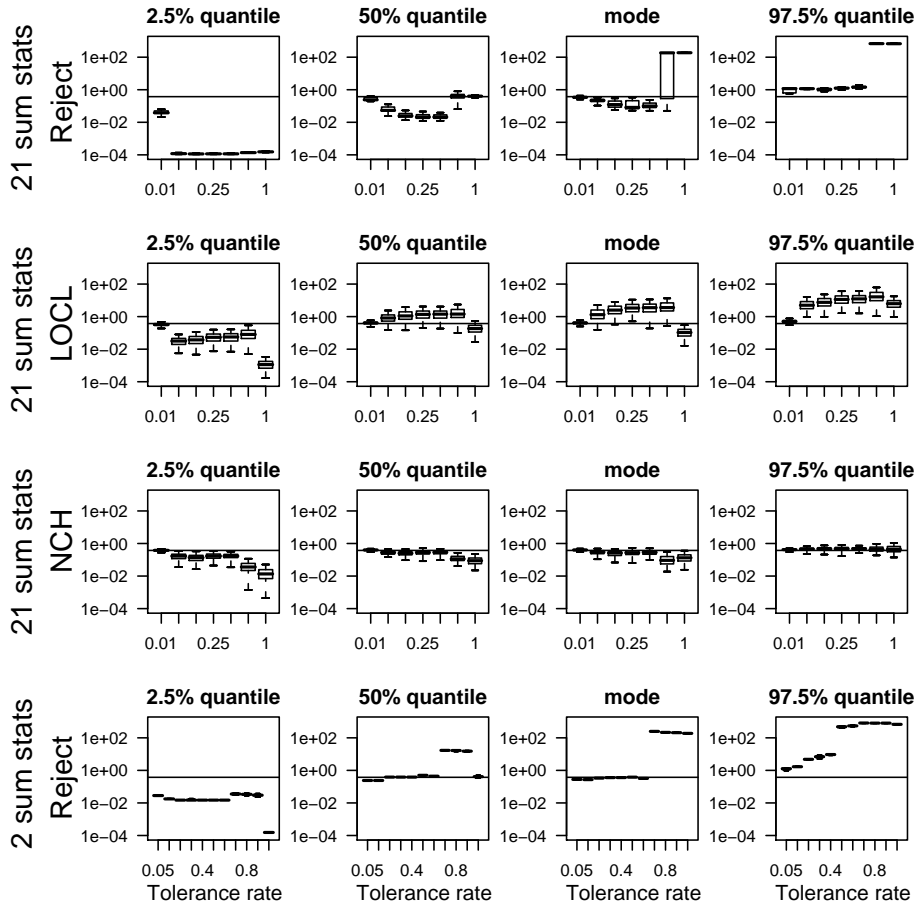


Figure 1: Boxplots of the $M = 200$ estimated modes and quantiles (2.5%, 50%, and 97.5%) of the approximate posterior distributions of λ_2 . For each ABC method and each value of the tolerance rate, 200 posterior distributions are computed for each of the 200 synthetic data sets. The horizontal lines correspond to the true values $\lambda_2 = 3.75 \times 10^{-1}$ used when simulating the 200 synthetic data sets. The different tolerance rates are 0.01, 0.05, 0.10, 0.25, 0.50, 0.50, 0.75, and 1 for all the ABC methods except the rejection scheme with the two summary statistics. For the latter method, the tolerance rates are 0.007, 0.02, 0.06, 0.13, 0.27, 0.37, 0.45, 0.53, 0.66, 0.80, 1.

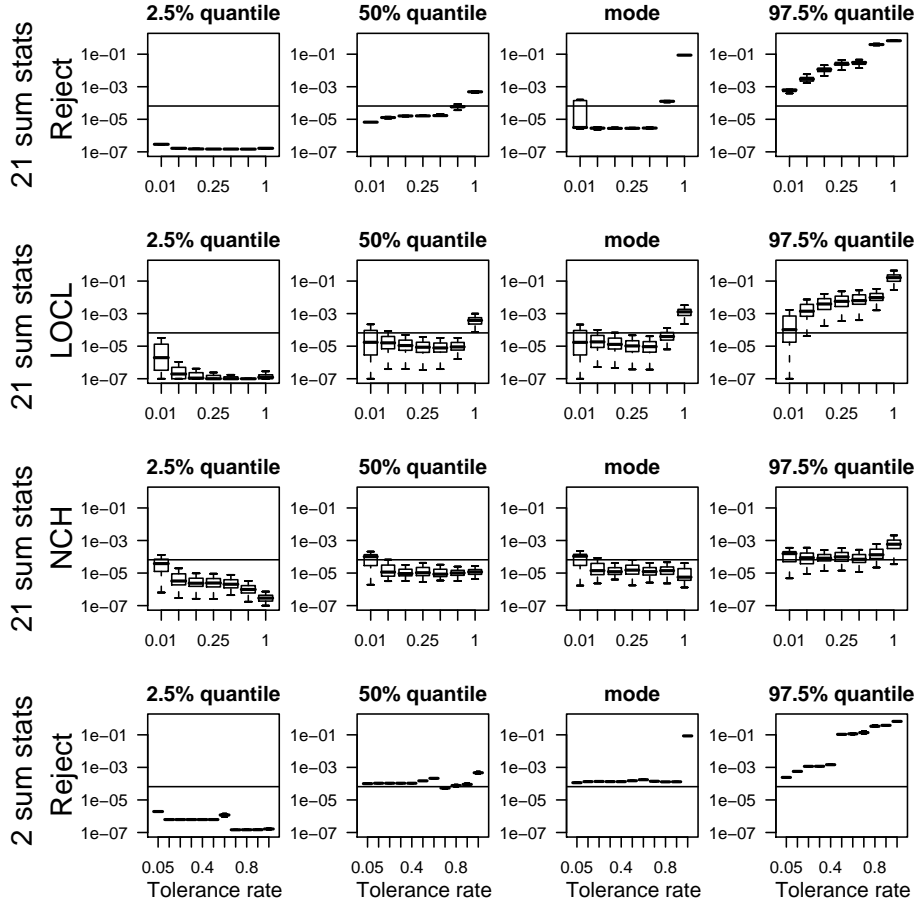


Figure 2: Boxplots of the $M = 200$ estimated modes and quantiles (2.5%, 50%, and 97.5%) of the approximate posterior distributions of λ_3 . For each ABC method and each value of the tolerance rate, 200 posterior distributions are computed for each of the 200 synthetic data sets. The horizontal lines correspond to the true values $\lambda_3 = 6.55 \times 10^{-5}$ used when simulating the 200 synthetic data sets. The different tolerance rates are 0.01, 0.05, 0.10, 0.25, 0.50, 0.50, 0.75, and 1 for all the ABC methods except the rejection scheme with the two summary statistics. For the latter method, the tolerance rates are 0.007, 0.02, 0.06, 0.13, 0.27, 0.37, 0.45, 0.53, 0.66, 0.80, 1.

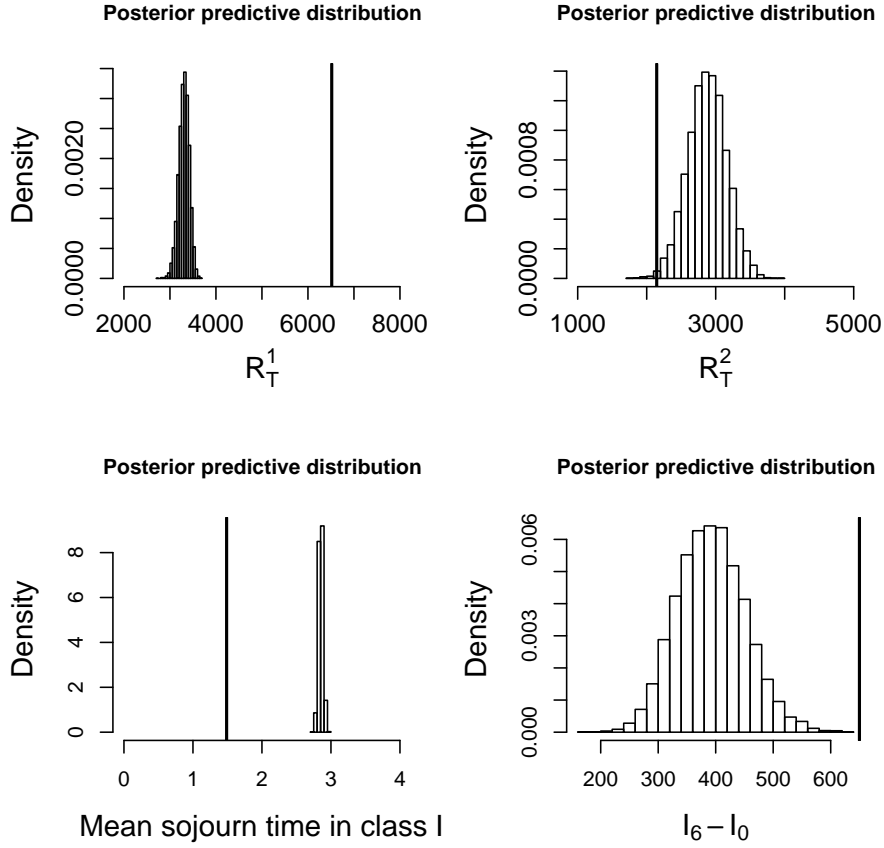


Figure 3: Bayesian posterior predictive distributions of $R_{21.5}^1$, $R_{21.5}^2$, I_6 , and the mean sojourn time in the class I. The vertical lines correspond to the observations. The SIR model corresponds to the model with a mass action principle. The approximate posterior samples are obtained with the smooth rejection ABC algorithm by making use of the 2 infinite-dimensional summary statistics R^1 and R^2 . A tolerance rate of $P_\delta = 1\%$ is considered for each summary statistic.