

Local DSA and Cori Estimator of Effective reproduction

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Abstract:

The effective reproduction number (R_t) is a key epidemiological metric that captures the temporal dynamics of an infectious disease outbreak and serves as a critical indicator of intervention effectiveness. Accurate and timely estimation of R_t is especially vital during the early stages of an epidemic. Traditional estimation approaches are often compromised by biases arising from misspecified generation or serial intervals, as well as incomplete or delayed case reporting. In this study, we propose a novel estimation framework that eliminates the need to estimate the generation or serial interval. We illustrate the approach using synthetically generated data that records individual infection times, applying likelihood-based inference within a standard mass action modeling framework to estimate R_t . The proposed method demonstrates improved robustness compared to conventional estimators, particularly in scenarios where classical assumptions do not hold.