
SICHENG ZHAO, McMaster University

Improving Infectious Disease Prevalence Estimation and Parameter Inference Using Number of Tests and Positivity Data

Prevalence of infection is a critical variable for modeling infectious dynamics and public health decision-making. However, estimating true prevalence from surveillance data remains challenging. Here we discuss three novel attempts to model testing mechanism using the beta-distribution, hazard rates and odds ratios respectively. These methods aim to link prevalence with the number of tests, test positivity, and some test characteristics at each data point in a robust, flexible, and theoretically justified manner. We further present a data-fitting framework based on the odds ratio approach and demonstrate its performance using simulated datasets as a proof of concept.