

Approximate Bayesian Computation (ABC) for the natural history of breast cancer, with application to data from a Milan cohort study

We propose a new class of multi-state models for the natural history of breast cancer, where the main events of interest are the start of asymptomatic detectability of the disease and the start of symptomatic detectability.

We develop a cure rate parametric specification that allows for dependence between the times from birth to the two events, and present the results of the analysis of longitudinal data from the Milan breast cancer screening program.

Due to the intractability of the observed likelihood function arising from the complex missing data structure, we rely on Approximate Bayesian Computation (ABC) for inference.

We discuss issues that arise from the use of ABC for model choice and parameter estimation, with a focus on the problem of choosing appropriate summary statistics.

The estimated latent disease process allows for the study of the effect of different examination schedules and adherence patterns on a population of asymptomatic subjects.