Optimal design of epidemic experiments

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We describe a method for optimal design of experiments for systems governed by stochastic processes, motivated by the processes typically used to model disease dynamics. The search for the optimal design uses Bayesian computational methods to explore the joint parameter-data-design space [4], accounting for *a priori* parametric uncertainty as well as population stochasticity. Statistical methods for inference in infectious diseases are well established [3] but are typically highly computationally intensive, making them impractical for a Monte Carlo search over multiple possible outcomes. We therefore resort to approximation to make the likelihood approximately tractable. We have shown that well-designed experiments can yield almost as much information as much more costly designs [1, 2]. The method is illustrated by application to botanical epidemics.

References

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