

Bayesian state-space models to optimize malaria vector control: quantifying the impacts on mosquito population dynamics and life history

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Vector control has been critically important in reducing malaria worldwide. Unfortunately, this progress has recently stalled or reversed in many areas. It is imperative to find new solutions that are faster and more sustainable in the long term. We propose to find ways to identify the mechanism and quantify the impact of interventions on mosquito dynamics and life history. We develop a Bayesian stage-structured population model under a state-space framework and apply it to time-series of mosquito surveillance data typically collected in field trials. This approach highlights both resilient and vulnerable aspects of the mosquito life cycle to different types of interventions and propose ways to optimize their deployment.