

**Title: Bayesian Multi-Stage Designs: A Game Changer in Phase II Clinical Trials**

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**Abstract:**

This paper focuses on the use of Bayesian multi-stage designs during Phase II clinical trials, an essential phase in drug development where the efficiency of a new drug is tested. It brings out how traditional frequentist methods for interim analysis have problems such as the requirement of fixed number of patients, which might not be practical for multicentre or multinational trials. In contrast, Bayesian multi-stage designs allow flexibility as their inference does not depend on sample sizes or early stopping rules. Moreover, it further expounds on the strengths of Bayesian techniques that combine prior knowledge and interim data to provide for dynamic updating of posterior or predictive probabilities with new observations available. This allows continuous interim analyses thus reducing the likelihood of sample size re-estimation. Finally, this article addresses a Bayesian design based on predictive probability with its implementation in R by employing ph2bayes package and a discussion on continuously monitor single-arm trials and comparative phase II studies.