

ComPAS: A Novel Bayesian drug combination platform trial design with adaptive shrinkage for I/O check inhibitors

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Abstract: Combining different treatment regimens provides an effective approach to induce a synergistic treatment effect and overcome resistance to monotherapy. It will be the trend for I/O check inhibitors too. The challenge is that, given the large number of existing therapies, the number of possible combinations is huge and new potentially more efficacious compounds may become available any time during drug development.

To address this challenge, we proposed a flexible Bayesian drug combination platform design with adaptive shrinkage (ComPAS), which allows for dropping futile combinations, graduating effective combinations, and adding new combinations during the course of the trial. A new adaptive shrinkage method is developed to adaptively borrow information across combinations and efficiently identify the efficacious combinations based on Bayesian model selection and hierarchical models. Simulation studies show that ComPAS identifies the effective

combinations with higher probability than some existing designs. ComPAS provides an efficient and flexible platform to accelerate drug development in a seamless and timely fashion. Paper is published in the journal of Statistics in Medicine and interactive R shiny app is available to public.