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Date: 5/12/2023 at 13:15 in 1 West 2.03

Title: Response-adaptive randomization in clinical trials: from myths to practical considerations

Abstract:

Response-Adaptive Randomization (RAR) is part of a wider class of data-dependent sampling algorithms, for which clinical trials are typically used as a motivating application. In that context, patient allocation to treatments is determined by randomization probabilities that change based on the accrued response data in order to achieve experimental goals. RAR has received abundant theoretical attention from the biostatistical literature since the 1930's and has been the subject of numerous debates. In the last decade, it has received renewed consideration from the applied and methodological communities, driven by well-known practical examples and its widespread use in machine learning. Papers on the subject present different views on its usefulness, and these are not easy to reconcile. This work aims to address this gap by providing a unified, broad and fresh review of methodological and practical issues to consider when debating the use of RAR in clinical trials.