

# Getting SMART about adaptive interventions in treatment, prevention and implementation science

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The effective treatment, prevention or management of a wide variety of health disorders often requires individualized, sequential decision-making. To do this, each individual's intervention is tailored over time based on the individual's history, e.g., changing disease or risk status, or adherence. Adaptive interventions (also known as dynamic treatment regimens in the statistical medicine literature) operationalize such individualized decision making using a sequence of decision rules that pre-specify which intervention option to offer, for whom, and when. Intervention options in this case correspond to varying doses, types or delivery modes of pharmacological, behavioral and/or psychosocial interventions. Recently, there has been a surge of interest in developing and evaluating adaptive interventions via randomized trials. Specifically, there is great interest in the use of sequential multiple assignment randomized trials (SMART), a type of multi-stage randomized trial design, to build high-quality adaptive interventions. The primary aim of this talk is to provide a brief, conceptual introduction to adaptive interventions and SMART designs. We will use various examples of adaptive interventions and SMART studies in child and adolescent mental health (e.g., ADHD, autism) to explain and illustrate ideas. If time permits, a secondary aim of this talk is to introduce the idea of adaptive implementation interventions and the use of cluster-randomized SMART designs for their development. In an adaptive implementation intervention, the intervention options—which, typically, are strategies designed to improve the uptake or delivery of evidence-based practices by a provider/site—are tailored over time based on the changing status of the provider/site. As an illustrative example, we will present the design of the AIM-Hi Study, a NIMH-funded cluster-randomized SMART which aims to develop a high-quality adaptive implementation intervention to improve the uptake/adoption of cognitive behavioral treatment in high-schools.

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