

Beyond the Bench: Bridging Biostatistics and Biomedical Research for Reproducibility and Translation

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Specters loom over biomedical research: A notable portion of published research findings cannot be replicated, while the promising advancements seen in experimental disease models often falter in clinical trials. This crisis in reproducibility has been acknowledged, with the translation of research from lab bench to patient bedside seemingly lost in a 'valley of death'. Various factors contribute to this translational attrition and lack of reproducibility, including the inherent complexity of biological processes, as well as issues with internal, external, and construct validity, among others that I will not delve into my talk. Instead, my focus will be on the role of flawed statistical practices in exacerbating this predicament. Many biomedical researchers prioritize achieving "significant" p-values over attaining accurate and robust scientific conclusions. These practices are fueled by incentive structures that prioritize flashy results over methodological rigor and the quality of studies conducted. In the realm of preclinical research, consultation with methodologists and statisticians often occurs post hoc, rendering it impossible to optimize study design. I argue that we must bridge the gap that has emerged between non-clinical biomedical researchers and biostatisticians over recent decades. This requires allocating more resources for training and support, as well as reforming academic incentive systems to encourage robust and reliable research.