Sample Size & Power Determination for Common Nonlinear Regression Models with Potential Stratification

By: Mike Martens, PhD

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Tuesday, Oct. 17, 2023 | 3:30PM - 4:30PM
Location: MEB M2050-M2070

Sample size and power determination are crucial design considerations for biomedical studies aiming to test the effects of treatments or risk factors on an outcome. Other prognostic factors may exist, necessitating the use of covariate adjustment when conducting this evaluation. Regression models are often employed for these purposes, formalizing this as a test of regression parameters. But, correlations may exist between the variable(s) of primary interest and other covariates, complicating sample size/power calculation. We propose a straightforward, formula-based approach to sample size & power determination that may be applied for commonly used regression models, including generalized linear models and ordinary and stratified versions of the Cox and Fine-Gray models. Rigorous simulations and theoretical derivations verify the formulas' accuracy in producing sample sizes that meet the type I error rate and power requirements of a study.

Mike Martens, PhD

Biography: Dr. Martens previous work in statistical methodology includes group sequential testing of time to event outcomes, sample size determination for generalized linear models and time to event regression models, and nonparametric Bayesian inference. Moreover, Dr. Martens research goals include providing innovative group sequential tests and adaptive design methods for time to event endpoints in clinical trials, improving the precision of treatment evaluation and flexibility of the study as well as reducing patient burden and study duration.

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