# Power under local alternatives for generalized estimating equations

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**Abstract**

This talk discusses the problem of calculating power in generalized estimating equation (GEE) settings that arise in biomedical studies involving clustered or correlated data (e.g., longitudinal studies and sibling studies). Existing approaches [e.g., Liu and Liang (1997) and Shih (1997)] approximate the power based on fixed alternatives. A more rigorous and potentially more accurate approach, however, is to study the power based on local alternatives (i.e., sequences of alternatives that converge at root-n-rate to the null hypothesis). Although such an approach to power analysis is a standard part of asymptotic efficiency theory, it has not previously been utilized in the GEE setting. Our results show that existing approaches (based on fixed alternatives) produce reliable power calculations for linear models, but not otherwise. In the important special case of the Wald test statistic in logistic regression with exchangeable correlation structure, the existing method can inflate the projected sample size (to obtain nominal 90% power) by about 10%, whereas the local asymptotic method is accurate to within 2%. The talk is based on joint work with Zhigang Li.