# THE ANALYSIS OF PIXEL INTENSITY (MYOCARDIAL SIGNAL DENSITY) DATA: THE QUANTIFICATION OF MYOCARDIAL PERFUSION BY IMAGING METHODS

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This paper described a number of important issues in the analysis of pixel intensity data, as well as approaches for dealing with these. We particularly emphasized the issue of clustering, which may be ubiquitous in studies of pixel intensity data. Clustering can take many forms, e.g., measurements of different sections of a heart or repeated measurements of the same research participant. Clustering typically has the effect of increasing variance estimates. When one fails to account for clustering, variance estimates may be unrealistically small, resulting in spurious significance. We illustrated several possible approaches to account for clustering, including adjusting standard errors for design effects and modeling the covariance structure within clusters using mixed models. These methods offer great flexibility for dealing with a wide variety of research designs and include the capability for adjusting for covariates and different case weights. Similar methods can be used to account for clustering in both superiority and equivalence analyses. In situations where clustering affects the true cluster mean, $\mu$, but not the *difference* between measures of the mean, it is possible that clustering will have a much greater impact on superiority analyses than on equivalence analyses.