Assessing Discrimination of Risk Prediction Rules in a Clustered Data Setting

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Abstract

The AUC (area under ROC curve) is a commonly used metric to assess discrimination of risk prediction rules; however, standard errors of AUC are usually based on the Mann-Whitney U test that assumes independence of sampling units. For ophthalmologic applications, it is desirable to assess risk prediction rules based on eye-specific outcome variables which are generally highly, but not perfectly correlated in fellow eyes (eg. progression of individual eyes to age-related macular degeneration (AMD)). In this article, we use the extended Mann-Whitney U test (Rosner et al, 2009) for the case where subunits within a cluster may have different progression status and assess discrimination of different prediction rules in this setting. Both data analyses based on progression of AMD and simulation studies show reasonable accuracy of this extended Mann-Whitney U test to assess discrimination of eye-specific risk prediction rules.

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