GRAPHICAL INTERPRETATION OF DIAGNOSTIC TESTS USING THE AGREEMENT CHART AND RECEIVER OPERATING CHARACTERISTIC (ROC) CURVES

S.I. Bangdiwala[1], A.S. Haedo[2], M.L. Natal[3]

[1]*University of North Carolina, Chapel Hill, USA*
[2]*University of Buenos Aires, Buenos Aires, Argentina*
[3]*National University of Mar del Plata, Mar del Plata, Argentina*

Email: *kant@unc.edu*

The 'agreement chart' displays the information contained in a square contingency table when two observers are independently classifying the same n items into the same k categories. When the number of categories k is equal to two, the 2x2 contingency table contains the information from a diagnostic test if one considers one of the observers as the test outcome and the other as the known outcome. For diagnostic tests, the most common graphical representation of the test information is the receiver operating characteristic (ROC) curve, a plot in the unit square of the test sensitivity against the test 1-specificity. Various quantifications are available for the test information, such as the test sensitivity, specificity, predictive values, likelihood ratios, and the area under the ROC curve (AUC). The quantification of concordance in the agreement chart is the B-statistic, the proportion of areas of agreement relative to the constraints of the marginal totals. This paper examines the relationship between the two graphical representations available for describing a diagnostic test, as well as among the summary statistics for diagnostic tests. Specifically, we study if there is a relationship between the AUC and the B-statistic. While the ROC graph incorporates information on sensitivity and specificity, the agreement chart also includes information on the positive and negative predictive values.