Predictive tools in the assessment of diagnostic tests*

Maria Antónia Amaral Turkman
University of Lisbon, Faculty of Sciences, DEIO and CEAUL
e-mail: maturkman@fc.ul.pt

Abstract

In clinical research, diagnostic tests are often used to assess disease status or other conditions. More than often, both the response variable, which is used to define the status of interest, and the variable (or variables) which are used as diagnostic tests, are continuous in nature. In most situations, comparison among different tests is done using ROC analysis based on sensitivity and specificity of the tests. However, while these measures are a good tool for discriminatory purposes, they are not in general good tools for predictive purposes. In this case, the usefulness of the diagnostic tests in competition should be based in the predictive values. The methodology behind the construction of optimal screening methods ([4]) is a basic tool to reach this goal in a variety of different situations. With those ideas in mind, a Bayesian method designated as "ROCP", ([2]) is suggested to compare the performance of tests based on their predictive capability, which generalizes the ideas behind the construction of the ROC curves. This methodology is compared with the "Skill Plot" introduced by Briggs and Zaretzki ([1]) in an attempt to answer the question "Are there analogs of ROC curves that generalize the notions of predictive values to continuous tests?" An application is done for diagnostic tests for respiratory insufficiency in amyotrophic lateral sclerosis ([3]).

References

[1] Briggs, W.M. and Zaretzki, R. *The Skill Plot: A Graphical Technique for Evaluating Continuous Diagnostic Tests.* Biometrics **63**, 2008, 250-261.

[2] Durão, N. and Amaral Turkman, M.A. *Aplicação do método de "screening" ptimo para construção de curvas ROC.* In Estatística com Acaso e Necessidade (editors Rodrigues, P.M.M., Rebelo, E.L. Rosado, F.), 2004, 189–198.

[3] Pinto, S. Pinto, A., Amaral Turkman, M.A., Swash, M., and Carvalho, M. *Predictive Value of Respiratory Tests for Respiratory Insufficiency in Amyotrophic Lateral Sclerosis.* (2008, submitted)

---

[4] Turkman, K.F. and Amaral Turkman, M.A. *Optimal screening methods.* Journal of Royal Statistical Society, B , **51**, 1989, 287–295.