Reviewer's report

Title: Empirical Comparison of Linear, Logistic, and CART Models for Binary Classification of Dyslipidemia from Anthropometric Measurements

Version: Date: 10 November 2003

Reviewer: Takamaru Ashikaga

Reviewer's report:

General
1-The manuscript represents a straight forward comparison of several competing approaches that attempt to explore interrelationships between a single outcome measure and multiple predictors in an attempt to explore if some items might be used as a preliminary screening set for dyslipidemia.

2-This is a well written manuscript that is easy to follow although several items are not presented. See item 7 and 8 below.

3-The conclusions are of value to those interested in general statistical methodology and those who are interested in two-stage types of population screening using correlates of a primary screening measure. The lack of any major differences in approaches is noteworthy. The bottom line comparison of classification into groups appears very reasonable as is the cross validation effort.

Discretionary Revisions (which the author can choose to ignore)

4-The authors might comment on the availability of the data itself and if such might be made available on a web site if such is possible for other investigators.

Minor Compulsory Revisions (such as missing labels on figures, or the wrong use of a term, which the author can be trusted to correct)

5-The results seem to indicate that there are not any major differences between the methods examined. Could the authors comment on the argument that CART is really for use with many more potential predictors and that the data structure for the CART approach is very limited as far as a CART application is concerned. In addition while the model based approaches are very simple, all of the data are being used to a degree with these models.

6-The cross validation effort conducted does differ to a degree from other possible validation efforts given two available data sets. The authors should be commended for attempting such an effort overall. They may wish to comment upon some alternatives such as sample splitting from both regions to develop the initial results and then conducting validation of the derived equations and algorithms using the remaining half-samples from both regions. This approach is clearly not possible when the models are developed prior to their application in another geographic area.

7-The contrast between a linear regression approach and a logistic regression approach seems very natural. However, the issue of developing a model based upon a continuous outcome and then using predicted values to formulate ordered categories or a dichotomy does not appear to be as direct as formulating the categories using the dependent measure initially and then using a multinomial or basic logistic regression model based approach. Thus the use of an estimated multiple linear regression model based value to categorize the dependent measures adds the issue of multiple linear regression prediction accuracy into the discussion. This area can be addressed with the
addition of some of the usual measures of goodness of fit for the models provided. This would include the usual multiple correlation coefficient for the multiple linear regression model as well as the Hosmer-Lemeshow type goodness of fit or McFaden’s rho square for the logistic model. However the multiple correlation coefficient may not tell the full story about the ability to predict values of the TC/HDL-C ratio in the region of 5.0 unless it is very near unity. In addition to the goodness of fit measures, it would be nice to see the regression coefficients and their standard errors since these are also usually provided in when these models are estimated.

8-Some of the results are not presented. Since there are no space limits, these should be included.

Major Compulsory Revisions (that the author must respond to before a decision on publication can be reached)

**What next?:** Accept after minor compulsory revisions

**Level of interest:** An article whose findings are important to those with closely related research interests

**Quality of written English:** Acceptable

**Statistical review:** No

**Declaration of competing interests:**

None