On a closed-form doubly robust estimamator of the adjusted odds ratio for a binary exposure

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Abstrak

Epidemiologic studies often aim to estimate the odds ratio for the association between a binary exposure and a binary disease outcome. Because confounding bias is of serious concern in observational studies, investigators typically estimate the adjusted odds ratio in a multivariate logistic regression which conditions on a large number of potential confounders. It is well known that modeling error in specification of the confounders can lead to substantial bias in the adjusted odds ratio for exposure. As a remedy, Tchetgen Tchetgen et al. (Biometrika. 2010;97(1):171-180) recently developed so-called doubly robust estimators of an adjusted odds ratio by carefully combining standard logistic regression with reverse regression analysis, in which exposure is the dependent variable and both the outcome and the confounders are the independent variables. Double robustness implies that only one of the 2 modeling strategies needs to be correct in order to make valid inferences about the odds ratio parameter. In this paper, I aim to introduce this recent methodology into the epidemiologic literature by presenting a simple closed-form doubly robust estimator of the adjusted odds ratio for a binary exposure. A SAS macro (SAS Institute Inc., Cary, North Carolina) is given in an online appendix to facilitate use of the approach in routine epidemiologic practice, and a simulated data example is also provided for the purpose of illustration.