PREVALENCE ESTIMATORS IN TWO-PHASE STUDIES

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Two-phase studies are used to estimate the prevalence of an uncommon disease when a long questionnaire or very invasive tests are required for the diagnostic. In the first phase, all subjects from the original sample are screened and, in the second phase, only a subsample is evaluated in-depth depending on their responses in phase 1. Typically, all individuals endorsing the screening, and a random proportion of the rest are selected for phase 2. We present three types of estimators for the analysis of data arising from two-phase studies: the imputation, the re-weighting estimators, and a combination of both. Imputation estimators require modelling the probability of disease conditional on the results of the screening and additional variables that may be predictors of the disease. Re-weighting estimators require estimates of the probability of selection for the second phase. The relative performance of these estimators was quantified by comparing their bias and their variance both in a simulation study and in a real study to assess the prevalence of social phobia using data from 6 European countries (ESEMeD project). In both studies we found that bias was negligible for all estimators assessed. Simulation results showed that the estimator that combines re-weighting and imputation had slightly greater variance than the rest. However, it was robust to misspecification of one of the two models fitted to estimate the probabilities above mentioned.