EMPIRICAL BAYES ESTIMATION IN HETEROGENEOUS MATCHED BINARY SAMPLES WITH SYSTEMATIC AGING EFFECTS*

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We discuss two empirical Bayes estimation problems for heterogeneous matched binary samples with systematic growth effects, in the applied study of recognized spontaneous abortion. The first problem is to estimate an assumed systematic component in the random growth curve, and sufficient conditions are provided for consistent estimation of governing structural parameters. The second problem is to estimate future risk based on past outcomes, and for this we extend Robbins' general empirical Bayes estimator for binomial variables to the case of a sum of conditionally independent, non-identically distributed binary variables.

1. Introduction.

There is an interesting application of empirical Bayes estimation in the study of recognized spontaneous abortion (miscarriage). We specify a mathematical model for binary outcome data that incorporates several factors identified by epidemiologists as necessary for a realistic analysis of obstetric sequences. The factors are heterogeneity of risk, systematic effects of maternal age and gravidity, selective fertility, and differential pregnancy

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