

On estimating the marginal hazard function using the family history information of case-control data

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Population-based case-control study design has been widely used in epidemiologic studies of chronic diseases such as cancer and coronary heart diseases. Even though the data are collected retrospectively, they could be analyzed as if they were prospectively collected using a logistic model and the odds ratios in this model approximate the relative risk if the disease prevalence is low (Prentice and Pyke 1979). This nice property couples with the cost and time efficiency of conducting studies has made the case-control study design very popular for studying, particularly, rare chronic diseases which sometimes may take many years to develop. However, case-control studies cannot provide any information about the prevalence of a disease because the proportions of cases and controls are controlled by investigators unless the population from which cases and controls are drawn is well defined and the disease prevalence has been tracked in the population. This, unfortunately, is not always the case. In this talk, I will describe a method that makes use of the family history information of cases and controls for estimating the disease prevalence in the population. The method doesn't require the knowledge of disease prevalence, nor the risk factors collected on the relatives. It only requires the ages at onset and disease status known for the relatives, which are routinely collected in case-control studies. I will present simulation results to show the finite sample properties of the proposed estimators and also real data analysis results to demonstrate the practical utility of the method.

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