A Simulation Study of the Self-Controlled Case Series Design

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Abstract

The self-controlled case series (SCCS) design is an outcome dependent sampling design developed to investigate the association between time-varying exposures and outcome events. This design automatically adjusts for all fixed covariates acting multiplicatively on the intensity function of a subject. It is based only on cases, and ignores controls. Since only cases are included, it is economically and computationally efficient compared with a cohort design. This property of the SCCS design also helps protect data privacy. Because of these reasons, the SCCS design is an important alternative to the cohort design especially when the outcome of interest is a rare event, and has been used in many studies in medicine, epidemiology and pharmacoepidemiology. Therefore, the main objective of this thesis is to investigate the SCCS design through simulations. We consider parametric, semiparametric and weakly parametric SCCS models, and compare them with well-known models based on the classical cohort design. We also illustrate the methods with a real life data set from medicine.