Latency Analysis Under the Cox Model with Applications in Air Pollution Study

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Abstract

We consider estimation and inference for latency in the Cox proportional hazard model framework, where time to event is the outcome. In many public health settings, it is of interest to assess whether exposure effects are subject to a latency period, where the risk of developing disease depending on the exposure level varies over time, perhaps affecting risk only during times near the occurrence of the outcome, or perhaps affecting risk only during times preceding a lag of some duration. Identification of the latency period, if any, is an important aspect of assessing risks of environmental and occupational exposures. For example, in air pollution epidemiology, of interest is often not only the effect of the m-year moving cumulative average air pollution level on risk of all cause mortality, but also point and interval estimation of m itself. In this talk, we will focus on methods for point and interval estimation of the latency period under a several models for the timing of exposure which have previously appeared in the epidemiologic literature. Computational methods will be discussed. The method will be illustrated in the study of the timing of the effects of constituents of air pollution on all cause mortality in the Nurses' Health Study.

Keywords: Latency; Cox model; Time to event data; Air pollution.

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