The University of Chicago Department of Statistics

Seminar Series

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Event History Analysis and the Cross-Section

MONDAY, April 27, 2009, at 4:00 PM 133 Eckhart Hall, 5734 S. University Avenue Refreshments following the seminar in Eckhart 110.

ABSTRACT

Individuals move between states with calendar time and duration since some time origin (birth, disease onset, treatment assignment, initiating time for attempting to get pregnant). At a certain point in calendar time all or a sample of individuals in a particular state are identified (the *prevalent cohort*). Information on incidence and mortality may be obtained from information in the cross-section alone, or from various combinations of prospective or retrospective follow-up. The Lexis diagram is helpful here.

I shall survey several examples of statistical problems deriving from observing prevalent cohorts, each connected to a concrete example in my own statistical experience:

If we only observe the age distributions of the diseased and the healthy in the cross-section we have *current status data* (application: rubella incidence based on seroprevalence data).

If we can perform retrospective follow-up we will at least have current duration data, where my experience derives from time to pregnancy studies. Additional survival information may allow for retrospective estimation of incidence, invoking Horvitz-Thompson type weighting (application: diabetes incidence in Fyn 1933–73 based on prevalent sample in 1973). A final example in this context regards retrospectively observed interaction between two life history events, allowing non-symmetric dependence concepts (application: pustulosis palmo-plantaris and menopause).

Prospective follow-up also presents challenges for the statistical modeller. A now classical topic is mortality estimation from prevalent cohort studies from forward recurrence times, length-biased data or delayed entry analysis (application: survival of diabetics based on follow-up of the prevalent sample from 1973). An extension of that is confirmatory analysis of a possible chance finding at an interim analysis of a clinical trial with staggered entry, obtaining by reusing, with delayed entry, the survivors from the interim analysis (application: breast cancer trial). A final very attractive application, not developed by me, is estimation of incidence and prevalence from pharmacoepidemiological databases.

Reference: Keiding, N. (2006). Event history analysis and the cross-section. *Statist.Med.* **25**, 2343–2364.

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