

Estimating crude cumulative incidences through multinomial logit regression on discrete cause specific hazards

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In clinical studies the estimate of the probabilities of a first failure for specific causes (crude cumulative incidence) is of particular interest while the analysis of the cause specific hazard functions provide useful information on the disease dynamic for biological hypotheses generation and follow-up planning. Recently, the estimation of crude cumulative incidence has received great attention in the methodological literature. The estimate can be obtained starting from regression models on cause-specific hazard or through direct modelling [1]. In this work a multinomial generalized linear model based on discrete cause specific hazards [2] is proposed to estimate, jointly for the different causes, the crude cumulative incidences and their asymptotic variances. The model is appealing considered its simplicity and allowing inference both on cause specific hazard and crude cumulative incidence. A flexible parametric modelling of the baseline effect is obtained resorting to a spline approach. Standard software can be used to compute all the quantities of interest.

A trial on chemoprevention of leukoplakias is considered where different pattern of risk and time dependent effects are suspect for the different causes of treatment failure.

References

- [1] Klein JP. Modelling competing risks in cancer studies. *Stat Med.* 2006 Mar 30;25(6):1015-34.
- [2] Biganzoli EM, Boracchi P, Ambrogi F, Marubini E. Artificial neural network for the joint modelling of discrete cause-specific hazards. *Artif Intell Med.* 2006 Jun;37(2):119-30.