



## STATISTICS SEMINAR

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*"Estimation of marginal structural survival models in the presence of competing risks"*

Friday, March 27, 2009

16:00

Room : **c 115 (STAT)**

### Abstract

Despite decades of research in the medical literature, the assessment of the attributable effect on mortality of acquiring an infection in the intensive care unit (ICU) remains a controversial topic, with several studies describing effect estimates ranging from being neutral to extremely risk increasing. At the root cause of this between-study variation lies the inappropriate adjustment (a) for informative censoring of the survival time by discharge from the ICU, and (b) for time-dependent confounders which lie on the causal path from infection to mortality. In previous work, we have accommodated time-varying confounders by using marginal structural survival models. Because discharge from the ICU is so intimately connected with a patient's health condition, the ensuing inverse weighting analyses rely heavily on the assumption of non-informative censoring (conditional on time-varying covariates) and may suffer from influential weights. In this talk, I will consider ICU-discharge as a competing risk and develop marginal structural models for the counterfactual subdistribution hazard with accompanying estimation methods. The proposed methods allow to infer the risk of ICU-mortality over time that would be observed if nosocomial infections could be prevented for the entire study population. In contrast to subdistribution hazards models with time-varying covariates, the proposed approach (a) can accommodate high-dimensional confounders, (b) avoids regression adjustment for post-infection measurements, and (c) results in a well-defined model for the cumulative incidence function. The proposed methods are used to quantify the causal effect of nosocomial infection on ICU-mortality using data from the National Surveillance Study of Nosocomial Infections in ICU's (Belgium).

*This is based on joint work with Maarten Bekaert and Karl Mertens.*

**You are welcome to the coffee break before the seminar (room : c 105)**

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