

Attributable mortality due to nosocomial infections: a simple and useful application of multistate models

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Background

Nosocomial infections constitute a major medical problem leading to increased morbidity and mortality of patients. Besides prolongation of length of hospital stay, mortality attributable to those infections is often the quantity of interest when describing their impact and consequences [3]. Since occurrence of nosocomial infections is a time-dynamic process, estimation of this quantity might be hampered by that fact. In addition, discharge of patients acting as competing risk and potential censoring of observation time has to be taken into account.

Methods

Since the term “attributable mortality” is used in a variety of meanings [4] we first review basic definitions; then we derive the quantities of interest in terms of transition probabilities arising in a suitably defined multistate model that allows straightforward estimation and interpretation [2;6]. Bootstrap resampling is used to calculate corresponding standard errors and confidence intervals.

Results

The methodology is applied to the data of the SIR-3 study, a prospective cohort study on the incidence of nosocomial infections in intensive care unit patients [1;5], where besides mortality attributable to nosocomial infections mortality attributable to infections already present at admission to ICU is considered, too.

Conclusion

Application of a multistate model turns out to be a useful and easily understandable approach for the estimation of attributable mortality in the setting of a prospective cohort study when the risk factor of interest is time-dependent and competing events as well as censoring have to be taken into account. Analysis can be performed by using our R-package change LOS (www.r-project.org).

Literatur

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