

A joint model for longitudinal continuous and time-to-event outcomes with direct marginal interpretation.

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Joint modeling of various longitudinal sequences has received quite a bit of attention in recent times. This paper proposes a so-called marginalized joint model for longitudinal continuous and repeated time-to-event outcomes on the one hand and a marginalized joint model for bivariate repeated time-to-event outcomes on the other. The model has several appealing features. It flexibly allows for association among measurements of the same outcome at different occasions as well as among measurements on different outcomes recorded at the same time. The model also accommodates overdispersion. The time-to-event outcomes are allowed to be censored. While the model builds upon the generalized linear mixed model framework, it is such that model parameters enjoy a direct marginal interpretation. All of these features have been considered before, but here we bring them together in a unified, flexible framework. The model framework's properties are scrutinized using a simulation study. The models are applied to data from a chronic heart failure study and to a so-called comet assay, encountered in preclinical research. Almost surprisingly, the models can be fitted relatively easily using standard statistical software