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*Analysis of Recurrent Exacerbations in Chronic Disease via Vine Copula Models*

In some chronic disease settings recurrent events have a non-ignorable duration and are characterized as episodes. We formulate models in which the onset times are generated according to a Markov time scale and the durations of the episodes are governed by a semi-Markov process. To reflect multiple dependencies, we consider a construction according to vine copula models in which the multivariate joint density is decomposed into a cascade of pairwise conditional density functions. We propose candidate models, study properties of them, assess treatment effects, and examine the biases arising from simple analyses which ignore some dependencies.