

## **Joint modeling of cognitive decline, dementia and death accounting for interval censoring of age at dementia**

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Dementia is a chronic disease of aging characterized by a continuous cognitive degradation process beginning several years before the diagnosis. The study of the natural history of dementia requires longitudinal analyses of repeated measures of cognition jointly with the risk of dementia. Moreover, as for all diseases in the elderly, the competing risks of death must be taken into account. We propose a joint latent class models for multivariate longitudinal data and semi-competing risks by combining a multivariate mixed model with latent process and an illness-death model. The parameters are estimated by maximum likelihood accounting for interval censoring of the age at dementia between the times of visit. The multivariate mixed model makes possible to analyze simultaneously several cognitive tests with different metrological properties. The model is applied to the French Paquid cohort including 3777 subjects, older than 65, followed every 2 or 3 years during 20 years.