

Latent transition regression for mixed outcomes

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Health status is often a complex outcome, characterized by multiple measures. When assessing changes in health status over time, multiple measures are typically collected longitudinally. Analytic challenges posed by these multivariate longitudinal data are further complicated when the outcomes are combinations of continuous, categorical, and count data. To address these challenges, we propose a Bayesian latent transition regression model for jointly analyzing a mixture of longitudinal outcomes from any distribution. Health status is assumed to be a categorical latent variable, and the multiple outcomes are treated as surrogate measures of the latent health state, observed with error. Using this approach, both baseline latent health state prevalences and the probabilities of transitioning between the health states over time are modeled as functions of covariates. The observed outcomes are related to the latent health states through regression models that include subject-specific effects to account for residual correlation among repeated measures over time and covariate effects to account for differential measurement of the latent health states when necessary. We illustrate our approach with data from a longitudinal study of back pain.