MULTIVARIATE MIXTURE MODELS TO DESCRIBE LONGITUDINAL PATTERNS OF FRAILTY IN AMERICAN SENIORS

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I propose two analytical methods which extend group-based trajectory models to multivariate outcomes. I use group-based longitudinal finite mixture models (i.e., developmental trajectory models) to identify and describe latent subpopulations of disability in American seniors. The latent classes are based on 6 Activities of Daily Living (e.g., eating, bathing) and 16 Instrumental Activities of Daily Living (e.g., managing money, taking medications) in the National Long Term Care Survey. This survey measures various disabilities in American elderly in 6 survey waves from 1982 to 2004. The first model marginally estimates latent classes for each of the 16 longitudinal outcomes then classifies seniors by their joint latent class distribution. The second model estimates latent classes while simultaneously considering all 16 longitudinal outcomes. With 16 dichotomous outcomes and up to 6 survey waves, there are 10^{28} possible outcomes per subject. Both models indicate that approximately 20 mixture groups adequately describe the majority of disability patterns in the population of American seniors. These models recognize that, within a mixture group, some disabilities may coincide while others may follow at a later time. These models demonstrate latent frailty patterns with illustrative plots that show multivariate temporal patterns within latent class. Finally, I compare distributions of multivariate, longitudinal outcomes by patient characteristics and co-morbidities.