INVESTIGATING LONGITUDINAL PATTERNS AND GROUP-LEVEL MODEL DEVELOPMENT FOR DIABETIC KIDNEY DISEASE PROGRESSION USING FUNCTIONAL DATA METHODS

ABSTRACT

Patients with diabetic kidney disease (DKD) are at high risk for kidney failure and estimated glomerular filtration rate (eGFR) trajectories are natural markers for DKD progression. Longitudinal trajectories may exhibit nonlinear trends with the timing and number of repeated measurements varying per patient, leading to irregularly spaced and sparse data. In this talk, we discuss the application of functional principal components analysis (FPCA) to model and investigate salient patterns of eGFR trajectories among clinical subgroups of patients with diabetes and chronic kidney disease defined by the presence of albuminuria. Furthermore, to determine whether fitting a full cohort model or separate group-specific models is more optimal for modeling long-term trajectories, we evaluated model fit, using our goodness-of-fit procedure, and future prediction accuracy. Our findings indicated there are advantages to both modeling approaches for accomplishing different objectives. While our application focused on DKD, our methods are applicable to other settings with longitudinally assessed biomarkers as indicators of disease progression. The talk concludes with a discussion of future directions to explore from both statistical and clinical viewpoints.