

MISQ Archivist

Trajectories of Repeated Readmissions of Chronic Disease Patients: Risk Stratification, Profiling, and Prediction

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Abstract

The problem of recurrent, unplanned readmissions, where some patients return shortly after discharge from the hospital and are readmitted for the same or a related condition, has become a challenge worldwide due to care quality, health outcomes, and financial concerns. Predicting frequent, preventable readmissions and understanding the contributing factors is a critical problem that is being widely studied. However, few studies have examined longitudinal risk stratification, profiling, and prediction of multi-morbid, heterogeneous patient populations. We examine how readmission risk may progress over multiple emergency department visits of chronic disease patients, their early stratification into distinct trajectories with related frequencies, and the relationship of these trajectories to patient characteristics. We further extend this analysis to investigate the impact of time-stable and time-varying covariates in predicting future readmission conditional on latent class membership. Results indicate that longitudinal risk stratification can enable early identification of specific patient groups following distinct trajectories based on their presentation for emergency care. Prediction models that incorporate latent classes perform well and demonstrate the promise of trajectory modeling methods combined with advanced prediction models for longitudinal risk assessment in addressing readmission challenges. The methodology and insights from this study are generalizable to other important Information Systems problems.

Keywords: Multiple chronic diseases, repeated readmissions, risk stratification, group-based trajectory model, covariate latent class model, hidden markov model, electronic health record, predictive analytics