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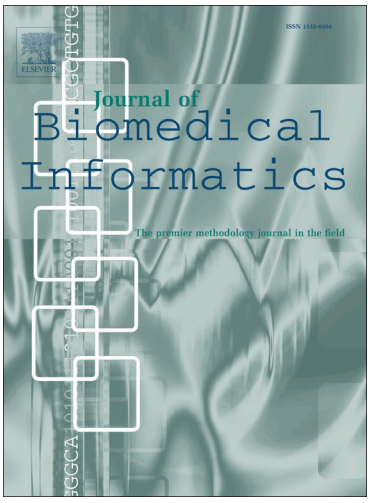

Flexible, Cluster-Based Analysis of the Electronic Medical Record of Sepsis with Composite Mixture Models

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ACCEPTED MANUSCRIPT

Flexible, Cluster-Based Analysis of the Electronic Medical Record of Sepsis with Composite Mixture Models

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Abstract

The widespread adoption of electronic medical records (EMRs) in healthcare has provided vast new amounts of data for statistical machine learning researchers in their efforts to model and predict patient health status, potentially enabling novel advances in treatment. In the case of sepsis, a debilitating, dysregulated host response to infection, extracting subtle, uncataloged clinical phenotypes from the EMR with statistical machine learning methods has the potential to impact patient diagnosis and treatment early in the course of their hospitalization. However, there are significant barriers that must be overcome to extract these insights from EMR data. First, EMR datasets consist of both static and dynamic observations of discrete and continuous-valued variables, many of which may be missing, precluding the application of standard multivariate analysis techniques. Second, clinical populations observed via EMRs

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[3]**Abbreviations**: EMR - electronic medical record, CMM - composite mixture model, ED - emergency department, KPNC - Kaiser Permanente Northern California, BIC - Bayesian information criterion, AIC - Akaike information criterion, PAM - partitioning around medoids, MICE - multivariate imputation using chained equations, MCAR - missing completely at random

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