

## Regular or Irregular: An Investigation of Medicine Consumption Pattern with Poisson Mixture Model

**Authors :** Lichung Jen, Yi Chun Liu, Kuan-Wei Lee

**Abstract :** Fruitful data has been accumulated in database nowadays and is commonly used as support for decision-making. In the healthcare industry, hospital, for instance, ordering pharmacy inventory is one of the key decision. With large drug inventory, the current cost increases and its expiration dates might lead to future issue, such as drug disposal and recycle. In contrast, underestimating demand of the pharmacy inventory, particularly standing drugs, affects the medical treatment and possibly hospital reputation. Prescription behaviour of hospital physicians is one of the critical factor influencing this decision, particularly irregular prescription behaviour. If a drug's usage amount in the month is irregular and less than the regular usage, it may cause the trend of subsequent stockpiling. On the contrary, if a drug has been prescribed often than expected, it may result in insufficient inventory. We proposed a hierarchical Bayesian mixture model with two components to identify physicians' regular/irregular prescription patterns with probabilities. Heterogeneity of hospital is considered in our proposed hierarchical Bayes model. The result suggested that modeling the prescription patterns of physician is beneficial for estimating the order quantity of medication and pharmacy inventory management of the hospital. Managerial implication and future research are discussed.

**Keywords :** hierarchical Bayesian model, poisson mixture model, medicines prescription behavior, irregular behavior

**Conference Title :** ICMSB 2019 : International Conference on Mathematics, Statistics and Biostatistics

**Conference Location :** Boston, United States

**Conference Dates :** April 24-25, 2019