MOX-Report No. 05/2019

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EVALUATING THE EFFECT OF HEALTHCARE PROVIDERS ON THE CLINICAL PATH OF HEART FAILURE PATIENTS THROUGH A NOVEL SEMI-MARKOV MULTI-STATE MODEL

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Keywords: clustering; decision making; multi-state model; nonparametric frailty.

Abstract

This paper introduces a novel exploratory statistical tool for investigating healthcare performance through clinical administrative databases. In particular, we propose a Semi-Markov multi state model in which the transition-specific hazards are estimated through a Cox model with a nonparametric discrete frailty term. The proposed model can be interpreted as probabilistic clustering technique. The main goal of this work is to investigate clusters (latent populations) of providers in each specific transition and then to investigate which are the most frequent and most extreme latent populations across all transitions. Transitions are defined by rates of readmission to, discharge from providers and death in or outside a provider. Rates of transitions are adjusted for patients' characteristics. It is important to notice that this model does not require the selection of providers characteristics to perform the clustering. Finally, we show the impact of the proposed model through a real application on the administrative database related to Heart Failure patients hospitalised in Lombardia, a northern region in Italy.

MOX Technical Reports, last issues

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