

Guy Brock, PhD

Assistant Professor

Department of Bioinformatics and Biostatistics, School of Public Health and Information Sciences, UofL

Use of competing risks for time-dependent outcomes in hospital epidemiology

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Hospital length of stay (LOS) and time for a patient to reach clinical stability (TCS) are two outcomes that have become increasingly important when evaluating treatment efficacy, patient management, quality of care, and hospital costs associated with treating diseases like community acquired pneumonia (CAP). A common difficulty in the medical literature is how to handle in-hospital mortality when analyzing these outcomes. Ad-hoc approaches that are commonly used include 1) restricting analysis to those patients who lived, and 2) assigning individuals who die the longest recorded LOS or TCS (the "worst" outcome). In this talk, we will demonstrate the drawbacks with both of these approaches, using both real and simulated data, and compare these methods with the advocated approach of treating in-hospital mortality as a competing risk. Future extensions of the competing risks model to a multi-state model, with clinical stability as an intermediate state, will also be discussed.