Hospital-Acquired Conditions (HACs), such as catheter-associated bloodstream infections, are acquired by patients due to suboptimal care they receive during their hospital stay. With more than 400,000 HAC-related deaths each year, HACs are the 3rd leading cause of death in the US; and they account for $22 billion in unnecessary healthcare spending. In recent years, several payment and delivery reforms have been introduced to control the occurrence of HACs. One such initiative is Medicare’s Non-Payment Program of 2008, which does not reimburse hospitals for the costs of HACs among elderly Medicare beneficiaries. By doing so, the Program aims to motivate hospitals to strengthen their quality improvement activities, thereby reducing the risk of HACs. In this study, we use big data to evaluate the role of this Program in preventing HACs from occurring, we model the differential effects of the Program across hospitals at varying financial risk, and we derive important policy implications.

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In studying the health effects of radiation, clustering techniques to identify subpopulations with densely sampled functional data are important for detecting late effects of radiation treatment. However, extraneous variables can mask the true group structure. Using a variable selection technique is particularly important in model-based clustering when little or no a priori knowledge of the structure or number of groups within the data is available, and when a large number of variables must be considered. Little work on variable selection methods for model-based clustering has been applied to functional data. We propose a greedy search algorithm to integrate variable selection into the clustering procedure and adapted to use with functional data. At each step in our method, two models are compared using the Akaike information criterion (AIC) corrected for small samples. One difficulty in implementing this approach is the lack of software available for constructing multivariate fully functional linear models of functional data represented by splines. We avoid this obstacle by creating a full model using a series of univariate partial functional regressions. Our new method successfully identifies the most important variables for clustering in two settings: a simulation study and a study examining the respiratory functions of irradiated and non-irradiated mice.

On-going Research Talk: The Role of Medicare’s Non-Payment Program in Preventing Hospital-Acquired Conditions

Caroline Thirukumaran
Department of Public Health Sciences

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Friday, April 15, 2016 | 11:30am – 1:00pm
Class of ’62 Auditorium (URMC G-9425)