Unsupervised topic modeling to quantify treatment variability during hospitalization for acute infection

Abstract: Sepsis, the body's life-threatening response to infection, is a major contributor to hospital mortality, killing 5 million people each year. Standardized care has improved sepsis survival, but these strategies employ a one-sized-fits-all approach, accounting for differences only between the simplest of patient subgroups that were developed based on limited pre-conceived criteria. Variability between patients is considered the single greatest barrier to improving sepsis outcomes and targeted treatment. We hypothesized that differences in clinician decisions of how to treat a patient would reveal underlying differences in the presentation of disease. We adapted a text-mining method (Latent Dirichlet Allocation) to quantify treatment themes from the first 24 hours of hospitalization using structured data from comprehensive electronic health record data of 30,000 patients. These treatment themes could be combined to represent the overall treatment needs for a given patient. Considered across the whole cohort, the treatment themes helped explain variability in sepsis outcomes. In this seminar, I will describe our approach and the insight it provides for improving targeted sepsis treatment.

About the Speaker: Dr. Fohner is an Assistant Professor in the Department of Epidemiology and Assistant Director of the Institute of Public Health Genetics at the University of Washington, and an adjunct Investigator at Kaiser Permanente Northern California's Division of Research. She is an epidemiologist with multidisciplinary training in genomics, pharmaceutics, bioethics, implementation science, and clinical informatics. Her work focuses on translational precision medicine research, especially combining diverse data types and innovative methods to identify opportunities to improve targeted therapies.

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