Ph.D. Dissertation Defense Seminar

# Learning Clinical Outcomes from Massive Observational Data


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## 10:00 AM
## 12-407 MDCC (Marion Davies Children Center)
## Friedman Board Room


**ABSTRACT:**
Emerging national patient claims and electronic health record databases offer a rich frontier for learning about treatment effectiveness and clinical decision making. However, these resources present statistical and computational challenges commensurate with their promise, requiring innovative approaches for practically and efficiently extracting meaningful results. In this defense, I seek to address some of these challenges. First, I present a hierarchical model for learning about the relationship between treatments and multiple related adverse outcomes simultaneously, showing that this approach can reduce bias in relative risk estimates. Second, I develop a novel minorization-maximization (MM) algorithm for uncoupling the sequential Newton steps that arise within the state of the art model fitting procedure for the conditional models popular for observational studies, allowing faster, parallelized model fitting. Third, I develop a birth-death model for treatment trajectories among patients with diabetes mellitus type II. In each topic, I discuss applications to observational healthcare datasets, demonstrating how these methods work at scale.


Doctoral Committee: Marc Suchard, M.D., Ph.D. (Chair),
Douglas Bell, Ph.D., M.D., Kenneth Lange, Ph.D., Eli Ipp, M.D.

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