

# Industrial & Systems Engineering Seminar

## A New Operational Framework for Reducing Hospital Readmissions

Wednesday, September 13

3:15 PM – Refreshments, 3:30 – Graduate Seminar

Lind Hall Room 305



**Professor Jonathan Helm**

*Supply Chain Management*

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Every year in the United States, readmissions cost the healthcare system \$15 billion annually, of which \$12 billion has been estimated to be preventable. Recent medical literature has found that post-discharge monitoring can reduce readmissions through early detection of health conditions. However, no analytical studies have investigated the operational problem of how to schedule and staff for a post-discharge monitoring. This talk presents methods to fill this gap by integrating a tailored time-to-readmission prediction model with optimization methods for scheduling and staffing a post-discharge monitoring organization. Specifically, we embed a delay-time model of patient health evolution into a controlled queueing network to simultaneously solve the scheduling and staffing problem. Projected benefits from a retrospective study indicate that 40-70% of readmissions could be caught before triggering and emergency readmission. Further, a partial implementation of our methods by an industry partner has demonstrated a 25% reduction in readmission rate in the first three months of use at a hospital in Indiana relative to pre-implementation levels.

**BIO:**

Jonathan E. Helm is an Assistant Professor of Supply Chain Management at Arizona State University. He received his Ph.D. from the University of Michigan, Ann Arbor in the department of Industrial and Operations Engineering where he was a three year National Science Foundation Fellow. Prior to his Ph.D. Jonathan worked at General Electric Healthcare in their supply chain. His research aims to improve the delivery of healthcare at three levels: the system level, the organizational level, and the individual patient level. Jonathan's work has been selected for Showcase Presentation at the 2014 and 2015 POMS CHOM Mini Conference, received first prize in the 2012 INFORMS "Doing Good with Good OR", as well as the 2011, 2015, and 2016 POMS CHOM best paper competition. His work has been written about in *Chicago Booth Capital Ideas* and *IU Kelley School of Business On Analytics Magazine*, as well as *Renal & Neurology News*, *Ophthalmology Times*, and *Urology Times* among others.