

OBA Seminar Series

Coordinating Care Services in Complex Health Care Networks

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Abstract: As healthcare delivery services become increasingly specialized, healthcare organizations face a growing need to coordinate care delivery across a network of disparate health services. Care service networks can be found at all levels of care delivery from outpatient family practice and specialist services to the complex network of services delivered by a hospital. In this talk, I will discuss some of the problems that arise from uncoordinated care delivery; problems that impact cost, quality and access in healthcare. A significant barrier to care coordination is a lack of visibility upon scheduling/admitting a patient to the future care services the patient may require. To address this issue, we develop patient type specific care needs forecasting models that can be linked to patient arrival streams and scheduling/admission decisions to predict workloads across the network of care services. We do so using stochastic arrival-location models of time-dependent queueing networks, where the workload forecast is generated in a manner that is linear in the healthcare organizations controllable decisions (patient schedule). This enables us to go beyond traditional simulation-based search methodologies and generate patient appointment/admission schedules that optimize system and patient-level metrics using linear programming approaches. I will conclude by discussing modeling approaches that incorporate the stochastic systems analysis and metrics from our patient flow framework into a linear programming approach for applications that include coordinating outpatient care services for breast cancer patients at the Mayo Clinic, and developing surgical scheduling guidelines to stabilize hospital census and coordinate hospital bed management, among others. Our approach coordinates patient arrivals to avoid overloading any of the care services in the network and can be used to reduce access block in hospitals, increase surgical volumes, ensure national and international outpatients complete care in a timely fashion, and more.

Biography: Jonathan E. Helm is presently a Ph.D. candidate at the University of Michigan, Ann Arbor in the department of Industrial and Operations Engineering. He received a Bachelor of Arts in Math and Computer Science and a Master of Engineering from Cornell University and a Master of Science in Engineering from the University of Michigan, Ann Arbor. He completed General Electric Healthcare's 2 year Operations Management Leadership Program working primarily in their diagnostic imaging business. He is currently a University of Michigan Rackham Predoctoral Fellow and was formerly a National Science Foundation Fellow in the area of Healthcare Operations Engineering with a focus on hospital patient flow and a Seth Bonder Fellow in Applied Operations Research. He currently collaborates with hospitals and healthcare organizations in the US (including the Mayo Clinic), Singapore, Canada and the Netherlands.

For information about the OBA Seminar series, contact Uday Rao, uday.rao@uc.edu, 513 556 7138.