OBAIS Seminar Series

SURGE: Smoothing Usage of Resources is Good for Emergencies

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Abstract: A mass casualty incident (MCI) results in a large and unexpected increase in demand for healthcare services, causing serious operational problems for affected hospitals, both in the immediate aftermath of the incident and in the longer-term recovery. The corresponding increase in supply to meet this demand is called surge capacity. We model the hospital's cost of surge capacity as a function of its time-varying workload. We analyze both immediate and long-term mechanisms by which a hospital can improve surge capacity: providers can use early discharge to immediately increase capacity, and they can also use a long-run demand management program to increase the likelihood that beds will be available at the time of a MCI. Using a simulation case study of four real hospitals, we analyze the joint impact of both actions in terms of the immediate response cost and the long-run bed blocking probability. We show that early discharge of patients sacrifices long-term recovery for short-term responsiveness, while proactive workload smoothing, a technique that is known to be beneficial for daily hospital operations but not yet explored in the context of MCIs, provides a Pareto improvement in the long-term and short-term performance metrics.

This is joint work with Yu Wang and Jonathan Helm.

Biography: Dr. Alex Mills is an Assistant Professor of Operations and Decision Technologies at the Indiana University Kelley School of Business. He received his Ph.D. from the University of North Carolina at Chapel Hill in 2012. Alex's main research interest is design and control of service systems. His current research focuses on emergency preparedness, planning, and response, especially with respect to prehospital healthcare delivery. His paper "Resource-Based Patient Prioritization in Mass Casualty Incidents," which recently appeared in Manufacturing & Service Operations Management, was recognized as a finalist in the Doing Good with Good OR paper competition in 2012. A translational version of this paper, aimed at providing practical insights to medical providers and managers, appears in the Spring 2014 edition of Journal of Special Operations Medicine.

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