Abstract
This talk will present capacity allocation and appointment scheduling models for community-based health care delivery for a chronic disease. In this setting, patients periodically visit the health care delivery system, which influences their disease progression and consequently their health outcomes. We investigate how the provider can improve access to care, thus improving community-level health outcomes, through better operational decisions pertaining to capacity allocation and appointment scheduling across different patients. To do so, we develop an integrated capacity allocation model that incorporates clinical (disease progression) and operational (capacity constraint) aspects. Specifically, we model the provider’s problem as a finite horizon stochastic dynamic program, where the provider decides which patients to schedule at the beginning of each period. Therapy is provided to scheduled patients, which may improve their health states. Patients that are not seen follow their natural disease progression. We derive a quantitative measure for comparison of patients’ health states and use it to design an easy-to-implement myopic heuristic that is provably optimal in special cases of the problem. We employ the myopic heuristic in a more general setting and test its performance using operational and clinical data obtained from Mobile C.A.R.E. Foundation, a community-based provider of pediatric asthma care in Chicago. Our extensive computational experiments suggest that the myopic heuristic can improve the health gains at the community-level by up to 15% over the current policy. The benefit is driven by the ability of our myopic heuristic to alter the duration between visits for patients with different health states depending on the tightness of the capacity and the health states of the entire patient population. If time permits, appointment scheduling models will be presented as well.

Bio
Karen Smilowitz is an Associate Professor in the Department of Industrial Engineering and Management Sciences at Northwestern University and holds a joint appointment with the Northwestern Transportation Center. Dr. Smilowitz studies modeling and solution approaches for logistics and transportation systems. She has developed innovative modeling and solution techniques for these complex transportation systems in both commercial and non-profit applications, working with transportation providers, logistics specialists and a range of non-profit organizations. She is currently leading the Northwestern Initiative on Humanitarian Logistics. Dr. Smilowitz received a CAREER award from the National Science Foundation and a Sloan Industry Studies Fellowship. Her work has also been recognized by the National Academy of Engineering, as an invited participant in the Frontiers of Engineering Workshop and the Engineering, Social Justice, and Sustainable Community Development Conference. She received her Ph.D. in Civil and Environmental Engineering from the University of California, Berkeley and her BSE in Civil Engineering and Operations Research from Princeton University.

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