

DEL AND BETH KIMBLER LECTURE SERIES

@ Industrial and Management Systems Engineering

A Latent Variable Approach to Potential Outcomes for Emergency Department Admission Decisions

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Biography

Professor Gabriel Zayas-Caban is the Jane R. and Jack G. Mandula Assistant Professor of Industrial & Systems Engineering in the College of Engineering and an affiliate member of the Berbee Walsh Department of Emergency Medicine.

Gabriel's research interests are in operations research with an emphasis on healthcare delivery. His focus is on applying causal inference approaches to understand the impact of emergency department (ED) admission decisions and other ED organizational factors on patient outcomes.

Date: November 2nd, 2020

Time : 11:00 am

Microsoft Teams

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Conference ID: 287 463 716#

Abstract

In emergency departments (EDs), care providers continuously weigh admissions against continued monitoring and treatment often without knowing their condition and health needs. To understand the decision process and its causal effect on outcomes, an observational study must contend with unobserved/missing information and a lack of exchangeability between admitted and discharged patients. Our goal was to provide a general framework to evaluate admission decisions from electronic healthcare records (EHRs). We describe admission decisions as a decision-making process in which the patient's health needs is a binary latent variable. We estimate latent health needs from EHR with only partial knowledge of the decision process (i.e., initial evaluation, admission decision, length of stay). Estimated latent health needs are then used to understand the admission decision and the decision's causal impact on outcomes. For the latter, we assume potential outcomes are stochastically independent from the admission decision conditional on latent health needs. As a case study, we apply our approach to over 150,000 patients encounters with the ED from the University of Michigan Health System collected from August 2012 through July 2015. We estimate that while admitting a patient with higher latent needs reduces the 30-day risk of revisiting the ED or later being admitted through the ED by over 79%, admitting a patient with lower latent needs actually increases these 30-day risks by 3.0% and 7.6%, respectively.