PROVIDING BETTER HEALTHCARE THROUGH SYSTEMS ENGINEERING

Process Mining Approaches to Identify System-Level Factors in Maternal Health Disparities

Sreenath Chalil Madathil, Ph.D.

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All seminars will be held in-person in IOE 1680 as well as virtually on Zoom. For the Zoom link and password, RSVP here.

The US has one of the highest maternal mortality and morbidity rates among all developed countries despite spending the most on maternity care. Half of all maternal deaths, Severe Maternal Morbidity (SMM), and near-misses are preventable with timely and appropriate care. Maternal mortality and SMM from several specific conditions, such as hemorrhage and preeclampsia, have much higher rates of preventability. Socioeconomic factors have been shown to impact maternal outcomes, however, there is little research explicitly examining system-level factors such as delays, missed or late diagnoses, inadequate teamwork, delays, and poor coordination within the health system that contribute to these adverse outcomes and disparities. National and state level efforts to improve maternal care has led to the development of best practices in maternity care pathways however many challenges still exist. Examining patients' journey through the health system will also enable us to identify, and ultimately predict, specific system features associated with adverse outcomes. This research approaches the care pathway analysis within the lens of process mining. Process mining evaluates the processes using event logs. The patient cohort consists of medical records for maternal patients who have initiated prenatal care and postpartum women with normal birth outcomes and adverse maternal outcomes. We used NIH's "AllofUS" dataset to develop a conceptual model to map maternal patients' interactions with the healthcare system. Process mining algorithms help us identify variability in these captured care pathways that are associated with adverse maternal outcomes. Preliminary data analysis using visualization and decision tree techniques offer insights about disparities in maternal care.

Dr. Sreenath Chalil Madathil is an Assistant Professor in the Industrial Manufacturing and Systems Engineering (IMSE) at The University of Texas at El Paso (UTEP). Before joining UTEP, he worked as research scientist at the Watson Institute of Systems Excellence at The Research Foundation of the State University of New York at Binghamton. Dr. Chalil Madathil received his Ph.D. and MS in Industrial Engineering from Clemson University. His current research interest is in applying operations research and data analytics to healthcare and supply chain domains. He is a member of the Institute of Industrial & Systems Engineers (IISE), and serves as chair for the IISE Health Systems Track. He is also a member of INFORMS, and Alpha Pi Mu.