Thesis Project Portfolio

Optimizing Outpatient Cancer Infusion Center Access Operations Using a Systems-Based Approach

(Technical Report)

Examining the Diversity of Approaches for Understanding Patient Flow

(STS Research Paper)

An Undergraduate Thesis

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Executive Summary

The Emily Couric Clinical Cancer Center (ECCCC) gives patients access to intravenous administration of medications and blood products, with a specialization in chemotherapy. There is currently a need for more strategic capacity planning, scheduling, and process optimization to minimize wasted resources and maximize patient satisfaction. The goal of the technical project is to perform a multifactor assessment of the current Infusion Center resource demands, patient flow practices, capacity utilization, and employee staffing. A broader objective is to initiate high impact changes to current system design and operational processes. The STS project will examine levels of understanding of the concept of patient flow across infusion center staff, as well as cancer patients. It will provide insights to help understand the situation a patient encounters when creating an appointment, and it will give background on the flow of a patient through the healthcare system. The hope is that through gaining knowledge of the obstacles the healthcare network faces when encountering discrepancies in patient care understanding (via the STS project), solutions to the problem of inefficient capacity utilization will become apparent (and can be used to complete the technical project). By learning more about how patients are processed by medical institutions, it will be easier to identify key metrics involved in patient access, as well as areas which can be focused on for improvement.

The Technical Report was intended as a response to the influx of patients in Infusion Centers across the nation, as cancer occurrence rates continue to increase rapidly. The research team utilized four main methods of data collection – analysis of electronic health record data, direct observations in ECCCC, staff interviews across the infusion center network, and solution development with hospital staff. Each of these methods was used in tandem to gain a

comprehensive snapshot of ways to improve the center. At the conclusion of data collection, it was determined that issues exist in terms of data reliability, access data collection efforts, room utilization, and weekly variability. Many time stamps from when patients entered and exited clinic rooms were missing from the data or were inaccurate. Room utilization was also much lower than expected, with an overall utilization estimate for the infusion center of 44%. Utilization differed greatly by day of the week, with Fridays being the lowest utilization and Tuesdays being the highest. Next steps include conducting future research into ways to combat data reliability challenges and implementing strategies to increase utilization on under-utilized days.

The STS Research Question is as follows: How do different actors within the UVA Infusion Center network conceptualize patient flow and understand the causes of poor flow. The intention was to discern differences in understanding of the concept based on role within the healthcare network. Evidence was gathered from a combination of sources, the primary one being interviews conducted with two clinic managers working on different floors of ECCCC. The two managers were asked a variety of questions related to patient flow comprehension. These interviews were supplemented by an extensive literature review highlighting the same topics as those discussed with the clinic managers. Several key themes were identified with regard to differences in patient flow understanding. Namely, comprehension of the idea of patient flow varies widely based on a individual's role in the healthcare network. Patients and providers tend to have very different understandings of patient flow, which impacts what strategies are typically implemented to improve it. Understanding of how long an appointment should take was also different for each stakeholder.

Overall, the team was able to complete all objectives which we set out to accomplish in the technical project. The research conducted was comprehensive and stretched across the entire infusion network, as was our intention. The findings were a step forward from prior literature, and there is a clear path forward to expand on the results obtained. Expanding on this research could take the form of implementing solutions to data reliability issues and observing their impacts on a floor-by-floor basis in the infusion center. The STS report also yielded valuable findings, as it allowed for the creation of a detailed list of themes regarding patient flow comprehension. Future research into the STS topic could incorporate more infusion center staff into the primary interviews to expand beyond simply the clinic manager perspective. Direct interviews with providers, infusion nurses, or infusion schedulers could be helpful. In addition, gaining the patient perspective through conversations with people who have moved through the infusion process could be insightful.