Prospectus

Optimizing Patient Flow during the COVID-19 Pandemic
(Technical Topic)

The Case of the UVA Internal Medicine, Primary Care Clinic: Using Actor Network Theory to Understand Key Weaknesses during the COVID-19 Pandemic
(STS Topic)

By

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On my honor as a University student, I have neither given nor received unauthorized aid on this assignment as defined by the Honor Guidelines for Thesis-Related Assignments.

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Introduction

With the need to expand access to healthcare and ensure a quality experience for a patient, optimizing patient flow is crucial in allowing staff to meet the demand for patient care while still "improving coordination of care, patient safety, and health outcomes" (NEJM Catalyst, 2018). While much research in this area has been focused on improving the patient flow in emergency departments of hospitals, primary care clinics also experience a wide range of patients with variable needs (Hostetter & Klein, n.d.). Located at the Fontaine Research Building in Charlottesville, VA, the Internal Medicine, Primary Care Clinic has experienced significant disruptions to their patient admittance process due to the Coronavirus Disease 2019 (COVID-19) pandemic.

Before the pandemic, a patient would follow a typical intake process: arrive at the clinic, check in, and then wait until a nurse called him or her back. However, this completely changed in March 2020, when the University of Virginia (UVA) Health System enacted new requirements for their clinics to combat the spread of COVID-19. These requirements included restricting the number of in-person appointments, enforcing social distancing, conducting patient screenings, and more ("What we're doing," 2020). Requirements similar to these have been instituted in clinics across the country, and the reduction of in-person appointments have caused significant financial losses to clinics (Rubin, 2020); one report stated that the "number of visits to ambulatory care providers had declined by 60%" in April 2020 (Mehrota et al., 2020). As the pandemic continues, there is a growing need to understand how to handle pre-COVID-19 levels of patients while still ensuring the safety of both patients and staff, and the solution to this problem will include designing a new system that will be able to optimize scheduling while encompassing these requirements.

To adequately address improving the patient admittance problem, there are various social factors that must be considered. The restrictions and staff shortages caused by COVID-19 have been a predominant actor in causing inefficiencies in the admittance process system, but there are also social factors relating to the overall organizational structure of the clinic that inhibit the communication among staff inside the clinic. The Primary Care Clinic is located in a suite with three other clinics and a lab, and they all have a shared waiting room area, check-in staff, and room space (K. Dowdell, personal communication, September 10, 2020). Consequently, there is often poor communication between the clinics and staff members throughout the patient admittance process, leading to greater inefficiencies in the process and overall confusion. Any improvements to the patient flow for the Primary Care Clinic will be rendered insufficient if the other clinics in the suite are not able to coordinate processes.

To effectively redesign the patient admittance process of the Primary Care Clinic, both technical and social factors must be considered. This paper is comprised of two major sections: the technical component and the STS component. The technical section outlines the problem and the process that will be used to develop a solution, and the STS section explains how Actor Network Theory will be used to understand both how the consequences from COVID-19 disrupted the stable network of the Primary Care Clinic and how social factors relating to the organizational structure influence a healthcare system.

Technical Problem[1]

Health systems worldwide have been disrupted significantly as a result of the COVID-19 pandemic. An article from the University of Virginia Health System Newsroom details its impact from March to April of 2020: ". . . hundreds of inpatient beds have been regularly unoccupied,

[1] This section was coauthored by Courtney Laughlin, Tom Peters, and Lily Stiles.

surgeries have declined by 70%, and clinic visits have been reduced by 90%. The result has been a fall in revenue from clinical care and related services that is producing a deficit of $85 million a month" (Swensen, 2020). As the pandemic has continued over the past months, there has been an increasing need to understand how to maximize patient flow under the new guidelines and to mitigate community spread of the disease. Specifically, the Internal Medicine, Primary Care Clinic has faced this challenge with its patient admittance process. Before the pandemic, the admittance process for this clinic began when the patient walked into the entrance of the building and checked in at central registration (refer to Figure 1) (K. Dowdell, personal communication, September 10, 2020). As seen in Figure 2, the patient then travelled to the clinic floor, checked in at the front desk in the clinic's suite, and sat in the waiting room until a nurse retrieved him or her (K. Dowdell, personal communication, September 10, 2020). Although sufficient for handling patient arrival under normal circumstances, the process was inadequate for supporting patient admittance in a pandemic.

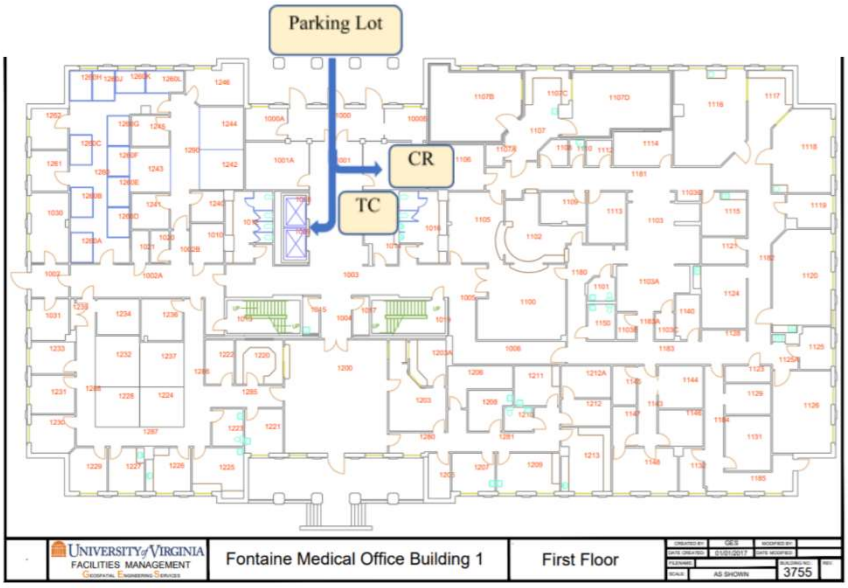

Figure 1. Diagram denoting patient flow process for patients going into Primary Care Clinic & locations of the parking lot, entrance of the building, central registration (CR), and temperature check (TC) (Geospatial Engineering Services, 2017).

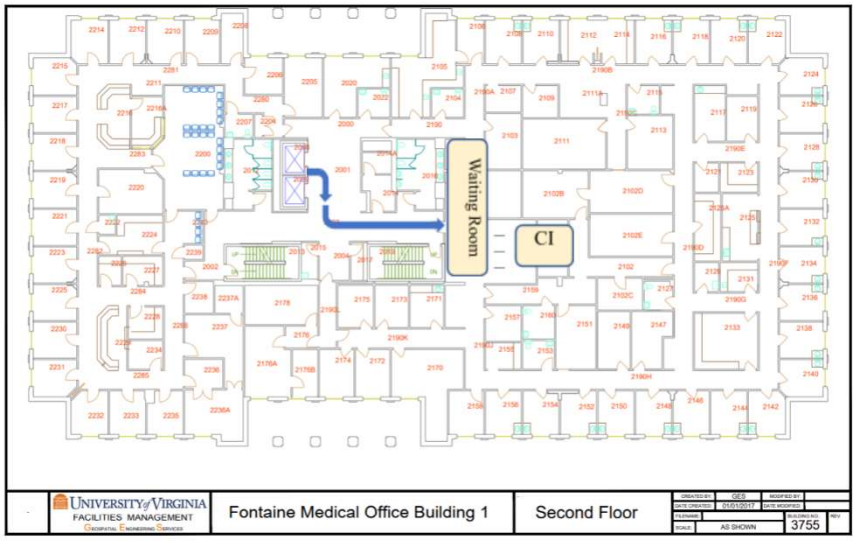

Figure 2. Diagram denoting patient flow process for patients going into the Primary Care Clinic & locations of the waiting room for the Primary Care Clinic and check-in to the clinic (CI) (Geospatial Engineering Services, 2017).

In response to COVID-19, the UVA Health System enacted new guidelines for ambulatory visits to reduce the number of patients in buildings and ensure a safe environment for patients and providers. These guidelines included prioritizing the use of telemedicine appointments for non-urgent visits and implementing COVID-19 mitigation procedures for in-person appointments, such as requiring social distancing, mask wearing, and patient screening (O'Donnell et al., 2020). Under the new process, patients are able to use remote registration from the parking lot, where the patient waits in the parking lot until clinic staff call him or her up to their suite (K. Dowdell, personal communication, September 10, 2020). Once called up, the patient enters the building, has their temperature checked, and proceeds to the clinic's reduced-capacity waiting room (K. Dowdell, personal communication, September 10, 2020). This new patient admittance process is meant to maximize the safety of patients and providers, but it makes it very difficult for the UVA Health System to operate efficiently and maintain pre-

COVID-19 patient flow. The consequences of not optimizing such a process include worker furloughs and lost revenue as well as general patient and provider frustration and safety.

The goal of this technical project is to refine and optimize patient flow in the Internal Medicine, Primary Care clinic – including its current patient admittance and scheduling processes – to help the clinic return to pre-COVID-19 patient levels while accommodating public health restrictions. To achieve this goal, the team will use a systems approach to understand the weaknesses of the current process and develop recommendations. More specifically, the team plans to conduct event simulations and statistical analysis techniques in R, Excel, and SAS on multiple different data sources to analyze factors relating to patient flow during the pandemic. These data sources include timestamp data from Epic, a healthcare software used for storing electronic health records; observational data gathered by the team; and survey data gathered from clinic staff that was designed by the team. The project will be broken up into two phases: the first phase will primarily consist of observation, data collection and analysis, and development of a plan of how to use these materials, while the second phase will include data modeling, prototyping, test implementation, and final recommendations.

STS Problem

The Internal Medicine, Primary Care Clinic is currently located in Suite 2100 with three other clinics and a medical lab (K. Dowdell, personal communication, September 10, 2020). While these groups all share the same waiting room and check-in staff, there is often poor communication between them. Currently, the Primary Care Clinic is struggling to perform optimally in various steps of the patient admittance process, resulting in delays and overall confusion of patients and staff. The restrictions put in place to reduce the transmission of COVID-19 are a clear disruptor, and many of the staff members also currently believe that

several of the problems in the current admittance process have occurred from not having enough personnel to perform the necessary tasks (Korte et al., 2020). The furloughs and economic constraints placed on the UVA Health System have only exacerbated this issue.

While these impacts of COVID-19 have contributed to the weaknesses in the Primary Care Clinic's admittance process, I believe that human factors must also be considered, such as the impact of internal organization structure on communication. Gabutti et al. wrote that "the quality of care patients receive not only depends on the resources available and the cost and clinical effectiveness of treatments, but also on the internal organization and the integration of the structures within which they receive assistance" (2017). The current organizational structure of the suite is very decentralized, with each clinic operating separately from one another and implementing slightly different processes for admitting patients. This is especially challenging for check-in staff who must understand the process for each clinic during the check-in process.

Natural human tendencies reinforce this disconnect that can be observed between staff. When immersed in one task, it can be easy for people to forget about other tasks, such as calling a patient upstairs or notifying a provider that a room is ready. One of the providers at Primary Care Clinic took note of this disconnect directly, mentioning that "clinic staff and providers are separated by a vast amount of space . . . [and] open rooms are not [always] recognized or communicated" (Korte et al., 2020). As a result, there are different social factors impacting the communication between clinics and staff, and this overall structure impacts the staff dynamics throughout the entire suite.

Consequently, it is important to also understand the influence of organizational structure on actors in the system, in particular providers and staff. Communication is essential to any successful system, and without considering this additional factor, the view of the Primary Care

Clinic system is incomplete. To better understand the roles of these different factors, I will use Actor Network Theory, which allows scholars to understand the complex relationships between actors in a network through the viewpoint of the network builder (Cressman, 2009). In Actor Network Theory, the network builder recruits different actors to the network to work towards a common goal (Cressman, 2009). As a result, the Primary Care Clinic can be represented as an existing network full of human and nonhuman actors that are monitored by the medical director of the clinic and are all working towards providing high quality healthcare to patients. I plan to use Actor Network Theory to analyze both how the COVID-19 pandemic disrupted a stable system and how the decentralized organizational structure influences the communication in the overall patient admittance process. I will gather information directly from clinic staff through interviews and questionnaires in an effort to examine the relationships between these different actors that are part of the Primary Care Clinic network.

Conclusion

The technical section of this paper outlines the goal of designing an improved patient admittance process for the Internal Medicine, Primary Care Clinic that will allow greater patient flow while enforcing COVID-19 requirements. The STS component will deliver an improved understanding of various social influences on the efficiency of the Primary Care Clinic's patient flow process. More specifically, the STS component will analyze the impacts that a healthcare system's organizational structure has on the communication of its employees and its overall efficiency.

Understanding the technical and social factors that impact the success of patient flow in a primary care system will be beneficial for clinics across the world. Other clinics are facing the same problems with new COVID-19 requirements, losses in revenue, staffing shortages, and

more, and the solution outlined in the technical section of this paper will be able to be reviewed by other clinics and potentially implemented. Additionally, the results of each project will contribute to learning how to improve overall patient flow of healthcare systems, thereby improving the quality of care for patients.

Word Count: 1905

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