

Investigating the Ways to Improve Patient Flow at UVA's Cancer Infusion Center

Discrimination and Inequity of Marginalized Groups in Healthcare Settings

A Thesis Prospectus
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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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Overview

Cancer infusion operations, specifically those related to chemotherapy and other cancer treatments, involve complex processes and require in-depth planning to ensure the efficient processing of patients. Cancer patients often require personalized and time-sensitive therapies, making it essential to optimize appointment slots, allocate medical resources, and manage staff efficiently. There are additional challenges related to patient flow, such as accommodating emergency cases, addressing unexpected complications, and managing varying treatment durations. Ensuring a balance between efficiency, patient health and satisfaction, and staff well-being is essential in operating cancer infusion treatments successfully.

For my senior Capstone Project, I am assessing and developing solutions to these issues in the UVA Cancer Center. I am advised by Rupa Valdez, researcher and associate professor in the School of Engineering and Applied Science and the School of Medicine, and joined by my team members Jameson Knotts, Lauren Petty, and Simona Brkic, fellow Systems engineering students. My technical project focuses on approaching these issues within the context of the Infusion Center at the University of Virginia's Emily Couric Clinical Cancer Center. My research plans to build upon prior Capstone projects, offering solutions for the specific challenges currently faced by the UVA Cancer Center. While addressing my technical project, I would also like to address the following research question: How can improvements to patient access at the UVA Cancer Center be implemented while providing a positive impact on marginalized populations in the present and future? Through my STS project, I will conduct observations of the UVA Cancer Center and conduct research on the historical and present-day problems surrounding unfair healthcare of marginalized populations to explore new avenues to address these concerns.

Assessing and Developing Solutions to Patient Flow

My technical project aims to explore existing data captured by the UVA Cancer Center, and additional data to accurately model the current patient flow. Our data set contains information regarding all of the appointments in the UVA Cancer Center, and the following associated data: Appointment Time, Patient ID, Date, Duration, Floor, Appointment Type, Appointment Department, Appointment Cancellation Status, etc. By analyzing these metrics using Excel and R, my team and I will create graphs and other visualizations to identify trends between different variables and to have a deeper understanding of the UVA Cancer Center operations. For instance, if the duration of an appointment is consistently, exceptionally long for a certain floor or department, it is likely that there is inefficiency with the current system for that floor or department that may be improved. This allows us to identify a multitude of potential problems and solutions, effectively creating opportunities to improve patient turnover and satisfaction. In addition to data analysis, my team and I will perform in-person observations of operations at the clinic to gain a better perspective of the processes that occur in the UVA Cancer Center. We will also perform interviews with key staff members to get a better picture of the inner workings of experienced staff members.

Reducing Unfair Healthcare of Marginalized Patients

My STS project is about improving patient access and healthcare disparities at the UVA Cancer Center for historically marginalized populations. For background, people of minority populations, and lower economic class are less likely to receive health care, as well as disabled individuals. Under United States law, our healthcare systems are required to provide fair access to healthcare regardless of race, religion, gender, or social/economic class (Schweikart, 2021). The complexities of the healthcare system, including affordability, access, and diversity, create

challenges in the task of achieving health equity (Chachra, 2023). “The Social Construction of Technological Systems” by Wiebe Bijker discusses how aspects of individuals’ identities can affect access to healthcare, including race and ethnicity, gender, socioeconomic status, disability, and location (Bijker et al., 2012).

Historically, there are also several accounts of discrimination and unfair treatment in healthcare settings. One of the most famous accounts is by the work of W. E. B. Du Bois and Isabel Eaton, “The Philadelphia Negro: A Social Study.” The book provides several accounts of inequalities among African Americans, shedding light on the systemic nature of inequities in healthcare and the impact of structural racism on health outcomes (Du Bois, 1899). This book focuses on the inequities of black people in Philadelphia in the late 19th and early 20th century, however, a more recent account of unfair treatment in healthcare was a heavily publicized story of renown women’s tennis player Serena Williams’s difficulty during childbirth. Williams, who has a history of pulmonary embolisms, urgently requested a CT scan and IV heparin, but her concerns were dismissed by a nurse, demonstrating the lack of respect and seriousness that black men and women often receive in healthcare settings (Salam, 2018). These accounts demonstrate the pervasive impact of racial bias in medicine and its role in healthcare inequity.

Using this background information in context to my technical project, I would like to determine the following: How will new systems at the UVA Cancer Center for improving patient access impact marginalized populations in the present and future? To determine this, I will generate potential solutions to improve patient access, then determine the limitations and biases that these solutions may place on marginalized populations. Healthcare clinics can develop new relationships with mobile healthcare clinics closer to individuals of lower economic status and disability to perform initial screening visits and bloodwork. Evidence also shows that enhancing

workforce diversity by recruiting and retaining healthcare professionals from diverse backgrounds to better reflect the patient population improves patient care (Washington, 2010). To improve workforce diversity, advocacy for fairness should be advocated for, as well as additional support for non-English speakers. Moreover, evidence has shown that advocating for initiatives to reduce financial barriers improves access to cancer treatment services for underserved communities (Smith, 2018). New financial assistance programs should also be created to improve access to life-saving treatments for lower-income patients. New treatment options should be available to patients such as personalized treatment and telemedicine, to provide healthcare to patients who need additional accommodations.

In-person observations and interviews at the UVA Cancer Center have also revealed that ensuring that proper signage and disability navigation and access is available, is extremely important. Lack of signage can result in difficulty navigating the hospital, which can be especially difficult for elderly, ill, or disabled patients. Cancer treatment options and equipment are sparsely available in the United States; therefore, many patients travel great distances to receive treatment. Minimizing the amount of travel for marginalized populations is especially helpful when treatment options are already scarce and expensive.

Methods and Frameworks

I will be using the disability and racial studies framework for my STS project methodology because race and disability status play a major factor in financial stability and access to healthcare. For the last aspect of my STS project, I would like to use my findings to spark a broader discourse on patient access optimization. I will prepare an academic paper, describing the research methods and summarizing research outcomes. I will present my findings at the Systems and Information Engineering Design Symposium (SIEDS). Additionally, I will

continue my research and contact staff members at the UVA Cancer Center, specifically Marquita Taylor, PhD, Associate Director, Diversity, Equity, and Inclusion, Roger Anderson, PhD, Associate Director, Population Sciences, and Wendy F. Cohn, PhD, Associate Director Community Outreach and Engagement. Furthering work with these key figures at the UVA Cancer Center will be especially helpful to combatting any inequality of healthcare due to their expertise in their respective fields.

Key Texts

Researching different accounts and research about healthcare equity is essential to developing a realistic idea of the impact of combatting inequities. Here are key and foundational texts that inspired and provided background for my STS project:

The study "Is 'health equity' bad for our health: A qualitative empirical ethics study of public health policy-makers perspectives," highlights ethical considerations involved in addressing health equity, providing perspectives of public health policy-makers and the challenges they face in promoting health equity. The study provides a deep-dive into ways how current policies, laws, and ethics impact healthcare inequity. The study goes over the consequences of health equity initiatives that failed and succeeded in the past (Smith, 2018).

The book "Medical Apartheid: The Dark History of Medical Experimentation On Black Americans from Colonial Times to the Present" by Harriet A. Washington provides a historical account of medical experimentation and racism on black Americans, emphasizing the need to address medical racism and its ongoing impact on health outcomes. The book reveals how African Americans have been exploited for profit through practices. The book also provides evidence of the systemic and historical mistreatment of minority groups in the healthcare system (Washington, 2010).

Lastly, the study "Achieving Equity in an Evolving Healthcare System: Opportunities and Challenges" offers valuable insights into the opportunities and challenges in achieving health equity, providing a methodology for addressing healthcare disparities in our healthcare systems. This study describes the current state of equity in healthcare by emphasizing the persistent disparities in health outcomes for racial and ethnic minorities, including specific illnesses. The study describes strategies to improve equity, such as implementing effective interventions, improving workforce diversity, utilizing technological advances, and personalized medicine (Williams, 2016).

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