

A Systems Approach to Optimizing Patient Flow During the COVID-19 Pandemic
(Technical Report)

**Understanding Historical Redlining's Effects on Community Health Today in Detroit:
A Technological Politics Case Study**
(STS Research Paper)

An Undergraduate Thesis Portfolio

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Socio-Technical Synthesis: Improving Access to Healthcare

In this portfolio there are two projects: a technical analysis of a primary care clinic's patient admittance process and a technological politics case study exploring the effects of a historical discriminatory socio-technical system on access to healthcare. My technical work can be used to improve medical clinic efficiency, which will expand the access to clinics for more patients. My STS research seeks to develop a new understanding for how the marginalization of African Americans in Detroit has reduced their access to healthcare. While these two projects have different stakeholders, they both facilitate methods to broaden access to healthcare.

Alongside my capstone team, I developed an approach to address patient flow disruptions for medical clinics, with a particular focus on primary care clinics. To develop this approach, we worked with the University Physicians primary care clinic at UVA's Fontaine Research Center. This clinic experienced several pain points in their patient admittance process, which were either created or exacerbated by the COVID-19 epidemic. It was determined that the clinic's scheduling, sign-in, and rooming processes provided the most opportunity for improvement. My capstone developed and implemented solutions to address these three primary problem areas in the clinic's patient flow. The primary solution that was tested was a new arrival process.

To limit the number of patients in the clinic's waiting room, the clinic initially had its nurses call up patients to come into the building for their appointment. This caused the nurses to waste time calling patients who did not answer, and some patients never received the call because they had provided the wrong phone number. To address this pain point in the patient admittance process, we implemented a new procedure where the patients would be told to enter the building 10 minutes before their appointments when they checked in. This solution

significantly reduced the nurses' workload for managing each patient from their arrival to check-in and increased the number of patients who arrived on-time for their appointments. Upon the completion of our analysis, my team developed a methodology for similar future work. This methodology should be used to improve the efficiency of medical clinics, allowing them to increase the number of patients they can care for.

My STS research also improves the access to healthcare in the United States, by building an understanding for why many African Americans have been marginalized from accessing healthcare. Using Langdon Winner's Theory of Technological Politics, I demonstrate how redlining, a historical, discriminatory socio-technical system, functions to marginalize Detroit's African American communities from accessing healthcare. In my analysis, I show how redlining prevented the growth of transportation infrastructure in redlined areas and how redlining prevented investment in redlined neighborhoods, which puts them at risk today for toxic lead exposure. Both points show how redlining functions as socio-technical system with inherently political properties, which continues to prevent Detroit's African American communities from accessing healthcare.

Working on these two projects helped me gain a sense of how large the issue of healthcare access in America is. There are many structural reasons beyond those discussed in my STS research that marginalize certain groups from accessing healthcare. From a technical standpoint, there are also many methods to improve the healthcare system by improving efficiency. By completing these projects simultaneously, I understood there are many sociology research questions to be asked and many technical solutions to be implemented to address the root causes of lack of healthcare access in America. In conclusion, working on these two projects together helped me understand the depth of this issue I addressed at large.

Table of Contents

Socio-technical Synthesis

A Systems Approach to Optimizing Patient Flow During the COVID-19 Pandemic

Understanding Historical Redlining's Effects on Community Health Today in Detroit: A Technological Politics Case Study

Prospectus