

Thesis Portfolio

Data Pipeline for Digitizing Perioperative Flowsheets from Low-Middle Income Countries

(Technical Report)

**Assessing the Effectiveness of Patient-Engagement Tools in Enhancing Representation in
Healthcare Systems**

(STS Research Paper)

An Undergraduate Thesis

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Sociotechnical Synthesis

Data has myriad potentials for revolutionizing patient care and outcomes in the healthcare space. In addition, technological implementation in that space has the opportunity to mitigate existing inequities, enabling more just healthcare systems. But what happens when existing infrastructure is insufficient for empowering data collection and processing necessary for an equitable future? What if existing data collection largely ignores marginalized communities whomst may be in the greatest need? How do we ensure that care is effective and patient-centered? Through my technical work and STS research, I examine and develop both new and existing data infrastructure and processes and assess how development of new institutions may enhance opportunities for equity within the healthcare innovation ecosystem.

My technical project focuses on improving the data digitization system developed for digitizing surgical flowsheets in Rwanda. Currently, there is a lack of infrastructure to support electronic health records in Rwanda and other low-middle income countries (LMIC). As a result, health records are recorded in paper-based systems, inhibiting the ability to aggregate data in a meaningful way, monitor population-level health metrics, or generate actionable insights. The previous system lacked a feedback mechanism for surgical outcomes and lacked efficient data upload and access mechanisms. A key improvement made was the introduction of a hypotension risk notification following flowsheet upload, implementing a surgical feedback system aiding medical practitioners in clinical settings. In addition, improvements were made in reducing upload time and access to existing submissions, new functionalities were added to improve user experience, and the existing system was transitioned to be hosted on scalable cloud infrastructure. The new system enables users to rapidly upload anesthesia records, enabling more efficient data collection that is able to provide feedback directly beneficial to clinical settings.

My STS project aims to assess patient engagement tools, such as PROMs and mHealth, in their ability to improve equitable clinical outcomes. I assess both the potential benefits and shortcomings of these patient engagement technologies, examining power dynamics, cultural contexts, and patient and public involvement theorizations in my effort to identify how these tools may fit into a system that prioritizes health equity. I then present some opportunities and considerations that are necessary for the pursuit of greater healthcare equity.

My technical project and STS research aim to identify and develop new institutions that provide a foundation and framework for achieving a more just healthcare system. While multiple approaches may be utilized in the implementation of this future, all approaches emphasize seeking cultural context in system design, dismantling power hierarchies to foster co-creation of health outcomes between practitioners and patients, and prioritizing marginalized voices. Future work could engage in a comparative assessment of the effectiveness of varying healthcare systems embodying different patient and public involvement(PPI) conceptualizations in improving equitable outcomes. It could also extend assessment to other emerging patient engagement tools.

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