

Non-Government Case-Mix Application

Project Title: Healthcare Operations Service Design in Mitigating Socioeconomic Disparities in Access to Cancer Treatment
IRBNet Number: 1862652-1

Non-Government Case Mix Application Section IV - Question 2

The purpose of this study is to better understand how healthcare operations can be better designed to mitigate socioeconomic disparities in access to cancer treatment at healthcare institutions in Massachusetts. I plan to evaluate the effectiveness of various novel hospital-level operational policies. These operational policies have been implemented to not only reduce disparities in access to treatment, but also to mitigate the operational and financial burden on hospitals seeking to provide optimal treatment for costly, uninsured patients.

Operations management scholars have long been concerned with service design to matching customers to optimal service, particularly in healthcare settings that serve patients with heterogeneous needs. Healthcare facilities face a particular challenge in efficiently and effectively providing care for underrepresented minorities and uninsured patients as these patients tend to require greater care at a higher institutional cost. One such setting in which this challenge is especially prevalent is cancer treatment. The National Cancer Institute reports that patients characterized as underrepresented minorities, lacking insurance coverage, lower literacy levels, etc., face significant barriers to receiving optimal care for cancer treatment.¹ One study has shown for example, that racial and ethnic minorities tend to receive lower-quality health care than non-Hispanic whites.² Another study has shown that historically, racial minorities and uninsured patients were underrepresented in cancer clinical trials.³

Patients in this setting thus offer a unique opportunity for operations scholars to better understand how healthcare operations can be designed to ensure such patients receive equitable care, an area of operations management that has been scantily studied. Existing studies in the field offer some evidence that careful service design in healthcare settings can in fact improve patient outcomes and improve institutional level operations. For example, one study has shown that practices aimed at continuity of care among diabetes patients with veteran status resulted in lower readmission rates.⁴ Another study demonstrates that adoption of clinical decision support systems significantly reduces the number of unnecessary amputations black patients experience.⁵

¹ "Cancer Disparities," National Cancer Institute, accessed January 17, 2022, <https://www.cancer.gov/about-cancer/understanding/disparities>.

² Rebecca L. Siegel et al., "Cancer Statistics, 2021," *CA: A Cancer Journal for Clinicians* 71, no. 1 (2021): pp. 7-33, <https://doi.org/10.3322/caac.21654>.

³ Bassel Nazha et al., "Enrollment of Racial Minorities in Clinical Trials: Old Problem Assumes New Urgency in the Age of Immunotherapy," *American Society of Clinical Oncology Educational Book*, no. 39 (2019): pp. 3-10, https://doi.org/10.1200/edbk_100021.

⁴ Vishal Ahuja, Carlos A. Alvarez, and Bradley R. Staats, "Maintaining Continuity in Service: An Empirical Examination of Primary Care Physicians," *Manufacturing & Service Operations Management* 22, no. 5 (2020): pp. 1088-1106, <https://doi.org/10.1287/msom.2019.0808>.

⁵ Kartik K. Ganju et al., "The Role of Decision Support Systems in Attenuating Racial Biases in Healthcare Delivery," *Management Science* 66, no. 11 (2020): pp. 5171-5181, <https://doi.org/10.1287/mnsc.2020.3698>.

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These studies, however, do not consider how operational policies and service design mitigate barriers to receiving care.

Several Massachusetts hospitals have begun to identify such barriers to receiving cancer treatment are working towards implementing new operational policies to remove These policies include for example, expanding Medicare and Medicaid coverage across healthcare institutions or Phase I clinical trials for novel cancer treatment, implementing electronic-health record sharing across institutions so physicians may collaborate on cases, sharing best-practices in cancer treatment practices across health care institutions, and providing additional social support for underrepresented minorities who are enrolled in clinical trials at institutions in Massachusetts.⁶

Using a dataset of MA inpatient encounters, outpatient observation stays, and emergency department encounters from Center for Health Information Analysis (CHIA), we plan to study the effect of these policies on several operational outcomes measures, including enrollment rates in clinical trials, time until a patient terminates participation in a clinical trial, and satisfaction levels with service experiences. We hypothesize that these policies increase participation rates and length of enrollment in clinical trials but may have varying effects on service experience when a patient participates in a clinical trial at an institution other than his or her preferred institution. Our primary research methodology will consist of causal inference methodologies, as is customary in empirical healthcare operations management research. This study may provide indispensable evidence that service design in the hospital setting plays a key role in removing barriers to equitable healthcare.

⁶ Abigail Moore, "Tackling Inequities in Cancer Treatment," Massachusetts General Hospital Giving, August 26, 2021, <https://giving.massgeneral.org/stories/tackling-inequities-in-cancer-treatment/>.

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Non-Government Case Mix Application Section IV - Question 4 (Research Methodology)

The primary objective of this study is to determine the effectiveness of several novel service-level operational policy changes at healthcare institutions in Massachusetts. These policies are aimed at mitigating socioeconomic barriers to cancer treatment that underrepresented minorities and uninsured patients often face when seeking treatment.

The first family of policy changes we intended to study were implemented at several Boston-area hospitals aiming to incentivize enrollment in clinical trials. Under one policy change, several Boston-area hospitals entered into a legal agreement allowing patients at a large safety-net hospital in Boston that largely serves underrepresented minorities and uninsured patients (and hosts a limited number of cancer treatment clinical trials) to participate in clinical trials at their institutions. Under this agreement, cancer patients not responding to traditional treatment are now able to access the benefits clinical trials. Under another policy change, Massachusetts General Hospital opted in to becoming an in-network healthcare provider for clinical trials for patients insured under the BMC HealthNet Plan, a Managed Care Organization plan offering insurance coverage to low-to-moderate income Massachusetts residents. Under this policy change, the costs of participating in cancer treatment clinical trials are now covered by the BMC HealthNet Plan.

The second family of policy changes we intend to study are aimed removing barriers to care while simultaneously promoting continuity of care. Such policies include allowing patients to participate in clinical trials at the institution of their choice, implementing an EHR-sharing platform that allows doctors across Boston-area hospitals to collaborate on specific cases, and providing social support services for patients participating in cancer treatment clinical trials.

The questions we plan to study intend to address the effectiveness of this family of policy changes: Do these policies improve enrollment rates in novel treatment programs, such as clinical trials for cancer treatment among URM and uninsured patients? Do they improve the likelihood such patients participate in the full length of treatment within a clinical trial? Are health outcomes, such as mortality and quality of life measures, improved from such patients because of participating in clinical trials?

To address these questions, we plan to employ an empirical methodology such as causal inference using CHIA's data on MA inpatient encounters, outpatient observation stays, and emergency department encounters. This methodology relies on finding an exogenous source of variation in the decision to participate in clinical trials, the decision to seek treatment at a different institution, the length of time a patient participates in a clinical trial, etc. We may then use customary econometric techniques such as difference-in-differences, instrumental variables,

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propensity score matching, etc. to study the impact of these operational policy changes. Such an approach would provide empirical evidence that these operational changes are in fact reducing barriers to treatment among the aforementioned populations.

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Section V – Question 1

This project is in the interest of the public because it serves to promote the improvement of equitable healthcare delivery to patients who have historically faced socioeconomic barriers to cancer treatment and to improve health outcomes of those patients. Completing this study will shed light on how hospitals and other health care institutions may increase enrollment rates of underrepresented minorities in novel cancer treatment programs (such as clinical trials) and reduce disruptions in care for uninsured patients receive. Results from the study will also provide evidence that health outcomes of such patients (including readmissions rates, mortality rates, and quality-of-life measures) are improved because of these operational policy changes. Healthcare facilities may also benefit from this study in that our results could provide data-driven evidence that implementing certain operational policies is economically beneficial. Furthermore, findings from this study may inform public health policy. For example, results from this study may help inform how to expand public health insurance plans to ensure patients have equal access to cancer treatment across healthcare facilities in Massachusetts.

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References

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