Defining Value in Population Health: Evaluating Program Impact and Outcomes

The Benefits and Challenges of the Implementation of Herbal Medicines and Supplements as Complementary Treatments for Cancer Patients

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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INTRODUCTION

Imagine a cancer patient, exhausted from the side effects of chemotherapy and desperate for relief, turning to herbal supplements after hearing stories of improved energy, reduced pain, and a greater sense of wellbeing. For many, these remedies represent hope where conventional treatments leave gaps. Researchers have found that about 22% of patients with cancer turn to herbal medicines following their diagnosis, suggesting that one in five patients integrate these alternative therapies into their treatment regimens (Asiimwe et al., 2021). Many cancer patients turn to these supplements with the hope of improving physical symptoms, emotional health support, stimulate the immune system, improve quality of life, and relieve side-effects of conventional treatment (Poonthananiwatkul et al., 2015). Despite their popularity, the integration of herbal medicines and supplements into cancer care remains a topic of debate within the medical community. Researchers revealed that while 66% of health care professionals believe herbal medicines can be effective for treating various health conditions, only 58% consider them safe (Bhamra et al., 2019). This disparity highlights the need for a deeper understanding of the implications and potential benefits of herbal medicines in cancer care.

This prospectus presents two interconnected projects focused on advancing the healthcare system: a technical project aimed at improving outcomes for the University of Virginia Health's Population Department, and an STS research project exploring the role of herbal medicines and supplements in cancer care. The technical project will focus on identifying and implementing strategies to improve one or multiple programs within UVA Health's Population Department, creating a unique opportunity to explore healthcare from both systemic and individual patient perspectives. Meanwhile, the STS research will explore the benefits and challenges posed by the implementation of herbal medicines into cancer care.

Insights from my STS research will inform my capstone project by emphasizing the need for a patient-centered approach that respects individual choices while prioritizing safety. By understanding patient preferences and behaviors, particularly the use of herbal medicines, UVA Health's Population Department can better tailor its service to accommodate diverse patient needs. This alignment between the projects demonstrates how integrating a holistic approach to patient care can improve overall outcomes.

This prospectus will outline the research questions for both projects, identify relevant social groups, and discuss the methods and frameworks I will use to investigate the integration of data driven strategies and complementary treatments in healthcare. By exploring these interconnected themes, I plan to demonstrate how a comprehensive approach to healthcare can better address the diverse needs of patients and improve their quality of life.

TECHNICAL PROJECT: Improving Outcomes for UVA Health's Population Department

The idea that "...it is home, not a hospital, where health is produced and promoted, the disease is detected, is initially addressed with home remedies, and a decision is taken when and which facility to go to for treatment" is becoming more recognized in the healthcare space with programs being implemented to bridge the gap between hospitals and homes (Kumar et al., 2023, p. 209). UVA's Population Health Department has a team dedicated to executing programs focused on improving individual, organizational, and cultural health. A major strategic priority of this team is health equity and spreading access to patient-centered and effective care. There are many programs that are already in effect to fundamentally transform healthcare delivery such as Interactive Home Monitoring, Virginia at Home, Community Paramedicine, MedicineHome, and WellAWARE. The struggle lies in monitoring these programs' impact, return on investment, and resource utilization, and in evaluating if the programs should be (dis)continued or changed.

Our research focuses on identifying key performance indicators (KPIs) for the Population Health programs and using analytics tools to evaluate program effectiveness in areas such as return on investment (ROI), readmission rates, and patient outcomes. Our approach will first involve extensive scoping of the problem, narrowing down our focus to specific programs to monitor and analyze based on UVA's Population Health's pain points and priorities. Relevant metrics for the programs selected will then be identified by observing the programs in effect and speaking to the Population Health employees. Alongside direct conversations and program observations, the team will perform academic research to identify metrics tracked by successful Population Health programs across the country to replicate their methods. To analyze these metrics, we will take a mixed method approach with quantitative data provided by UVA Health and qualitative data that we will collect, which is important as it "can play an important role

generating an improved understanding of disease, health and health care" (Verhoef & Casebeer, 1997, p. 65). Once the data has been gathered, the team will create recommendations for data collection improvement and any holes in metric tracking that exist. Then, using the data that does exist, the team will analyze trends and attempt to prove each program's value using either Python or SQL. This data analysis and collection standardization plan will serve as the foundation for a future dashboard that tracks the Program's metrics, assessing program effectiveness while monitoring diseases, patient and UVA Medical Center costs, resource utilization, and other key trends. In performing metric identification and data analysis, the team will strive to abide by a SIEPS model, one that looks at the whole view of a system rather than one particular aspect (Carayon et al., 2006).

While working on this problem, the team will consist of five Systems Engineering students, guided by our advisor, Rupa Valdez. We will also be working with UVA's Population Health Department and the Operations and Systems Engineering Department. By April 2025, we hope to provide a standardized methodology of metric tracking and a baseline of performance analysis to help UVA Health evaluate programs, improving care and resource utilization.

STS PROJECT: The Benefits and Challenges of the Implementation of Herbal Medicines and Supplements as Complementary Treatments for Cancer Patients

Research Question

Herbal medicines offer potential benefits that appeal to many cancer patients, with some remedies specifically addressing common symptoms associated with cancer and its treatments. For instance, Sipjeondaebo-tang (SDT) has shown effectiveness in reducing cancer-related fatigue—a prevalent and debilitating symptom among cancer patients. In a study evaluating SDT, participants reported significantly reduced fatigue after three weeks of treatment compared to a placebo group, suggesting its potential as a viable symptom management tool. Unlike conventional treatments, which can carry safety concerns or produce side effects, certain herbal medicines like SDT present promising alternatives with fewer harmful effects (Lee et al., 2021).

Despite these potential benefits, herbal medicines also pose significant challenges. Scientific support for their efficacy and safety in cancer care is often limited, and these supplements can interact negatively with conventional treatments. For instance, the evaluation of herbal medicines is complicated by factors like geographical origin of herbal material and drug interactions, which may lead to adverse side effects. Additionally, the lack of standardization in the preparation and administration of herbal products can introduce significant risks for patients, highlighting a pressing need for rigorous research and professional guidance (Saggar et al., 2022).

These complexities raise essential research questions: What are the benefits and drawbacks of implementing herbal medicines as complementary treatments for cancer patients? How are these therapies perceived by different social groups, and what cultural, regulatory, and scientific factors shape their acceptance or rejection? Through my STS research, I aim to answer

these questions, focusing on both the social and medical implications of herbal medicines in cancer care. I will explore how these treatments are integrated into the healthcare system, how they are understood by diverse stakeholders, and how policies and communication impact their acceptance and use.

Relevant Social Groups

Several social groups are involved in the use and perception of herbal medicines for cancer treatment. The first and most directly affected group is cancer patients and their families. Many patients seek herbal supplements to alleviate physical symptoms, support emotional health, and improve quality of life. Families also play a key role, often influencing patients' decisions about complementary therapies. Understanding these groups' motivations, beliefs, and experiences is critical to evaluating the impact of herbal medicines on patient care.

Healthcare providers represent another essential group. Doctors, nurses, and other medical professionals hold diverse opinions on the efficacy and safety of herbal medicines, and as trusted sources of medical advice, their perspectives can strongly influence patient choices. Healthcare providers play a crucial role in guiding patients' use of herbal supplements and either facilitating or inhibiting their integration into conventional care.

A third relevant group is policymakers and health authorities, who establish the guidelines that govern the use of herbal medicines. They address quality, safety, and efficacy concerns, making their role critical in shaping policies that can support or restrict the integration of herbal medicines in cancer care. Understanding the views and actions of these stakeholders will provide insight into how regulations and healthcare policies influence the use of herbal supplements in cancer treatment.

Method

My research will focus on the policy and communication dimensions of herbal medicine use in cancer treatment, specifically how these factors shape the acceptance and integration of these treatments in healthcare. From a policy perspective, I will analyze current regulatory frameworks governing the quality and safety of herbal medicines, identifying potential gaps or inconsistencies that could impact patient outcomes and healthcare providers' recommendations.

On the communication side, I will explore how herbal medicines are discussed across different social groups including patients, healthcare providers, and policymakers. This approach will examine how herbal medicines are framed across public health messages, media outlets, and discussions within healthcare, revealing how these narratives can influence whether herbal medicines are embraced or questioned as complementary cancer treatments. By examining the interplay between policy and communication, I aim to gain insight into how positive perceptions and targeted policy can support safe, informed integration of herbal medicines into cancer care, promoting patient empowerment while prioritizing health and safety.

Framework

To analyze the role of herbal medicines as complementary treatments for cancer, I will apply the Social Construction of Technology (SCOT) framework, which is particularly valuable for exploring how diverse social groups construct distinct meanings and concerns around these treatments. A core concept within SCOT, interpretive flexibility, allows me to examine how each social group—cancer patients and families, healthcare providers, and policymakers—forms unique interpretations of herbal medicines based on their specific needs and perspectives (Pinch & Bijker, 1987). By examining these varied perspectives, SCOT helps reveal why technologies like herbal medicine gain acceptance or encounter resistance within healthcare.

In my research, I will use SCOT to analyze each group's specific problems or concerns associated with herbal medicines. For example, healthcare providers may perceive herbal supplements as potential safety risks, focusing on the likelihood of adverse interactions with conventional treatments. In contrast, patients and their families might view herbal medicines as avenues for symptom relief and empowerment in their care, often prioritizing these over standard safety concerns. Meanwhile, policymakers might center on the need for regulatory oversight, seeing the lack of standardization in herbal supplements as a barrier to ensuring quality and safety for patients.

Applying the SCOT framework allows me to explore how these distinct concerns shape the broader conversation on integrating herbal medicines into cancer care. By understanding each group's perspective, I can identify how these problems could be addressed through policy adjustments, improved communication channels, and evidence-based safety measures, all of which are essential for more effective integration. SCOT thus provides a structured approach for examining how the unique interpretations and needs of each group influence the acceptance and adaptation of herbal medicines in healthcare.

Key Texts

Asiimwe, J. B., Nagendrappa, P. B., Atukunda, E. C., Kamatenesi, M. M., Nambozi, G., Tolo, C. U., Ogwang, P. E., & Sarki, A. M. (2021). Prevalence of the use of herbal medicines among patients with cancer: A systematic review and meta-analysis. *Evidence-Based Complementary and Alternative Medicine*, *2021*, 1–18. https://doi.org/10.1155/2021/9963038

The authors argue that many cancer patients, especially in low- and middle-income countries, use herbal medicine alongside conventional treatments due to cultural beliefs and economic constraints. It emphasizes the need for evidence-based integration of herbal medicine

into cancer care to ensure safety. This aligns with my STS research on how technologies like herbal supplements are shaped by socio-cultural factors and influence healthcare practices.

Callon, M. (2000). *Some elements of a sociology of translation: Domestication of the scallops and the fishermen of St. Brieuc Bay*.

Callon argues that technological change results from negotiations among social groups with differing interests. Using scallop farming as a case, he shows how actors align their goals through translation. This supports my focus on policy and communication research, emphasizing their role in shaping how stakeholders adopt and adapt technologies.

Herbal Medicine for Cancer Patients: An evidence based review. (2008). *The Internet Journal of Alternative Medicine*, *5*(2). https://doi.org/10.5580/502

Wheat and Currie argue that herbal medicines may help manage side effects of cancer treatments, improving outcomes and compliance, but lack clinical evidence. It emphasizes the need for research and collaboration to ensure safe integration. This aligns with my research on the challenges and potential of integrating new technologies, like herbal supplements, into healthcare.

Kumar, S., Bhardwaj, P., & Kumar, N. (2023). Need to Bring Family to the Heart of Healthcare as it is Home, not a Hospital, Where Healthcare Begins and Ends. *Indian journal of community medicine : official publication of Indian Association of Preventive & Social Medicine*, *48*(2), 209–213. https://doi.org/10.4103/ijcm.ijcm_95_23

The authors argue that families are key to promoting health and managing illness but are often overlooked in healthcare systems. It advocates for family-centered care in policies and training. This aligns with my STS research by highlighting how social factors, like family

support, influence health outcomes and the use of technologies like herbal supplements in cancer treatment.

Ng, J. Y., Verhoeff, N., & Steen, J. (2023). What are the ways in which social media is used in the context of complementary and alternative medicine in the Health and medical scholarly literature? A scoping review. *BMC Complementary Medicine and Therapies*, *23*(1). https://doi.org/10.1186/s12906-023-03856-6

The authors argue that social media shapes public beliefs about Complementary and Alternative Medicine (CAM) therapies, providing information but also spreading misinformation. It highlights ethical concerns and reliability issues. This is relevant to my STS research as it shows how technology can both empower and mislead, influencing public health decisions and perceptions of non-traditional practices like CAM.

Pinch, T., & Bijker, W. (1987). The Social Construction of Facts and Artifacts: Or How the Sociology of Science and the Sociology of Technology Might Benefit Each Other. In *The social construction of technological systems: New Directions in the sociology and history of technology* (pp. 28–46). essay, MIT Press.

Pinch and Bijker argue that technological artifacts are shaped by the social meanings and needs of different groups, emphasizing that technology evolves through societal demands. This supports my STS research on herbal supplements and guided my decision to use the SCoT framework to analyze how stakeholders shape the role of these supplements in cancer treatment and healthcare.

Saggar, S., Mir, P. A., Kumar, N., Chawla, A., Uppal, J., Shilpa, S., & Kaur, A. (2022). Traditional and herbal medicines: Opportunities and challenges. *Pharmacognosy Research*, *14*(2), 107–114. https://doi.org/10.5530/pres.14.2.15

The authors highlight the growing interest in herbal medicines for cancer treatment, emphasizing their potential benefits but also challenges with validation, regulation, and integration. It calls for robust research and standardized practices. This aligns with my STS research by examining the politics of herbal supplements, particularly their acceptance and regulation in healthcare.

Schils, A., Lechon, A.-S., Rondeaux, S., Souard, F., Van Laethem, J.-L., Pochet, S., Mathieu, V., & De Vriese, C. (2023). Cancer patients' behaviors and attitudes toward natural health products. *BMC Complementary Medicine and Therapies*, *23*(1). https://doi.org/10.1186/s12906-023-04278-0

The authors argue that cancer patients often use natural health products (NHPs) alongside conventional treatments due to personal beliefs, cultural influences, and perceived efficacy. It highlights the need to understand patient attitudes and the role of healthcare providers in these discussions. This supports my research by framing herbal supplement use within the social and cultural context of healthcare decisions, contributing to my analysis of their politics in cancer treatment.

Stub, T., Quandt, S. A., Arcury, T. A., Sandberg, J. C., Kristoffersen, A. E., Musial, F., & Salamonsen, A. (2016). Perception of risk and communication among conventional and complementary health care providers involving cancer patients' use of complementary therapies: A literature review. *BMC Complementary and Alternative Medicine*, *16*(1). https://doi.org/10.1186/s12906-016-1326-3

The authors argue that complementary therapies for cancer patients offer benefits but pose risks due to poor regulation, untrained providers, and communication gaps with conventional care. These risks include harmful products and delayed treatments. This informs my STS research by emphasizing the need for regulated practices and interdisciplinary communication to safely integrate herbal supplements into cancer care.

Treasure, J. (2005). Herbal Medicine and cancer: An introductory overview. *Seminars in Oncology Nursing*, *21*(3), 177–183. https://doi.org/10.1016/j.soncn.2005.04.006

Treasure argues that botanical medicines offer significant potential in cancer treatment by complementing conventional therapies, enhancing outcomes, and reducing side effects. Unlike pharmaceutical drugs, they target multiple mechanisms, offering cost-effective and safer alternatives. This supports my STS research by highlighting the technological and socio-political dimensions of herbal medicines, challenging pharmaceutical dominance and promoting patient-centered care.

CONCLUSION

This prospectus outlines two interconnected projects aimed at enhancing healthcare outcomes through both technical and social lenses. The technical portion focuses on developing data-driven solutions to optimize program delivery within UVA Health's Population Department. By identifying and analyzing key performance indicators (KPIs), our team will evaluate the effectiveness, return on investment, and overall impact of specific programs. Through a combination of quantitative and qualitative data analysis, the project will identify potential improvements in data collection practices and suggest enhancements for ongoing program assessment.

The STS portion investigates the complex role of herbal medicines as complementary treatments for cancer patients. Using the Social Construction of Technology (SCOT) framework, this research will examine how various social groups construct and interpret meanings around herbal treatments, which in turn affects their level of integration into mainstream healthcare. This study aims to reveal how cultural, social, and institutional factors shape the acceptance, regulation, and use of these treatments, providing insights into the broader implications of incorporating alternative therapies into cancer care. The goal is to promote more inclusive healthcare approaches that recognize patient preferences while prioritizing safety and efficacy.

By mid-February 2025, I plan to complete a literature review and stakeholder analysis for my STS project, followed by policy and communication analyses and the application of the SCOT framework by April 2025.

Together, these projects offer a comprehensive approach to improving healthcare by combining technical advancements with an understanding of social implications. By focusing on both data-driven improvements to healthcare programs and the social aspects of alternative

treatments, this prospectus presents a vision for a healthcare system that is more effective, informed, and responsive to diverse patient needs.

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