# Using Network Optimization to Reduce Outmigration,
# Improve Care Continuity, and Recapture Volume

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**Abstract**

This capstone project addresses the critical issue of patient referral outmigration at a community hospital, a phenomenon causing substantial revenue loss and fragmented care continuity, which jeopardized a necessary master campus expansion. The outmigration was driven by a high rate of referrals to non-aligned providers, specifically a 32% external outmigration rate and 25% of internal referrals channeled to Opt-In Unaligned providers. The project's core objective was to optimize the hospital's Opt-In Provider Network to strategically redirect patient referrals back into the affiliated system, thereby minimizing revenue outmigration and ensuring timely access to high-performing providers. The methodology utilized a quantitative, quasi-experimental approach, comparing a 12-month historical baseline with a subsequent 6-month post-intervention period, leveraging de-identified referral data from the hospital's electronic medical record. The intervention involved implementing new referral protocols and a targeted educational initiative focused on Emergency Department and Urgent Care staff to promote the use of aligned, high-access Opt-In providers.

*Keywords: outmigration, network optimization, referral patterns*

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## Introduction

Located 12 minutes outside of the Texas Medical Center, is a community hospital that serves as the hospital of choice for community members and, as such, has historically operated well beyond its capacity. After a change in executive leadership, hospital operations, including opportunities for improvement, were thoroughly examined for areas of opportunity. One such area noted was network optimization, that is the strategic and data-driven approach to designing and refining the network of aligned providers and resources to ensure efficient, high-quality, and timely care for patients requiring medical follow up care after an emergency department visit which can include subsequent specialist referrals (Hosseini Shokouh, 2022). The goal of network optimization, at this facility, is to maximize the performance of the hospital by optimizing patient flow, reducing wait times for follow up care, and ensuring patients are directed to the most appropriate, in-network, and high-performing providers (Hosseini Shokouh, 2022). Ultimately, the goal of network optimization is to create and improve internal referral processes so that they are efficient, high-quality, and result in timely follow-up care for the community that the hospital serves.

In an effort to ensure patients are referred, primarily, to providers who can consistently meet their needs, the hospital system developed a program dubbed the Opt-In Provider Network. To participate, healthcare providers must agree to a strict set of standards: they must be actively accepting new patients, able to accommodate referred patients with an appointment within a prompt three business day window, and either already have online scheduling or be willing to implement it within a two-week timeframe. To launch this initiative efficiently, the hospital first evaluated the specific physician specialties most frequently referred to for post emergency department follow-up care. Then, using the generated specialty list, providers were reached out

to in order to discuss their desire to participate in the Opt-In program. Those providers who met eligibility and expressed a desire to participate in the Opt-In program were presented with the opportunity to formally participate. This methodical approach ensured that the network is composed of high-performing, readily accessible providers who are fully aligned with the hospital's goals for patient continuity and efficiency while meeting the regulatory requirements established by the state and federal government.

On the referring provider side of the Opt-In Network process, when a patient presents to the emergency department, the free-standing emergency department, or an affiliated urgent care, the emergency room provider initiates a referral by first typing in the service needed. Providers who are employed by the healthcare organization populate the top of the list, they are then followed by providers who have elected to participate in the Opt-In program, and lastly, are followed by all other providers in that specialty within the specified distance. This feature allows the referring provider to instantly know who is aligned with the organization, the hospital, and is able to accommodate the patient quickly. Additionally, because the geographical restriction, these providers are located within a short distance of the hospital, making follow-up care convenient for the patient and their family. Crucially, while the Opt-In list provides the most efficient options, the referring provider retains the ultimate flexibility and clinical judgment to choose the best provider for the patient from the full directory, even if that provider is not part of the aligned Opt-In network.

When senior leadership examined the entire process of network optimization numerous opportunities were found and reviewed for improvement. Of utmost importance, there were a large number of patients who were leaving the hospital system altogether, more than 32% in total, which is referred to outmigration. Patient outmigration occurs when patients are referred

to healthcare services or choose to seek healthcare services outside of the system. Outmigration can refer to a patient being referred to a provider who is not aligned with the hospital or leaving the hospital system altogether. For the purpose of this capstone paper, outmigration occurring from both the hospital, the focus of the interventions, and also outmigration that occurs when patients leave the hospital system that the community hospital is affiliated with, will be discussed in this paper. The phenomenon of outmigration can be driven by factors such as the perception of higher quality of care or improved outcomes at competing institutions, the local facility's lack of specialized services due to being a newer community hospital, or long wait times and capacity issues, however further investigation into this phenomenon found that the outmigration that was occurring was largely due to referrals made by locum emergency room providers. For this hospital, patient outmigration presents a significant threat, resulting in the loss of service volumes and critical revenue highlighting gaps in the hospital's local service offerings, thereby posing a challenge to the hospital’s financial stability and its ability to maintain comprehensive community care.

In addition to the patients who were migrating completely out of the system, there were also patients who were migrating away from the hospital to sister facilities. The providers these patients were referred to are part of the larger system’s Opt-In Network; however, they were not directly affiliated with this particular hospital, so while the patients were staying in the larger system network, they were leaving this hospital specific network of aligned providers. The team worked to identify those providers who are both participating in the Opt-In program and are directly aligned with the community hospital and branded them as Opt-In Aligned providers. When the data was analyzed, it was found that almost 25% of the referrals out of the emergency department were going to providers who were labeled as Opt-In Unaligned. Opt-In Unaligned

was the term used to identify those providers who had elected to participate in the Opt-In program however, their affiliations were with another hospital within the system and not the community hospital. This significant internal migration highlighted an opportunity to recapture volume by steering patients toward aligned, high-performing providers within the hospital's immediate network. Addressing this internal outmigration became a critical second priority alongside reducing external patient outmigration.

Despite the efforts that existed to provide comprehensive post emergency department visit care, the hospital system faces a significant challenge in patient retention, manifested by both external patient outmigration to competing organizations and internal outmigration to sister facilities. This fragmentation of care hinders continuity of patient follow-up, negatively impacts quality of care metrics, particularly concerning the timely accommodation of patients after an emergency department or urgent care visit and results in lost revenue. Specifically, data revealed that almost 25% of referrals were channeled to Opt-In Unaligned providers, indicating that patients were unnecessarily leaving the hospital's immediate network, even while remaining in the larger system. The rationale for this project is thus two-fold: to mitigate external outmigration by ensuring local, specialized care is accessible, and to recapture internal volume by utilizing the Opt-In network to preferentially direct providers toward affiliated, high-performing Opt-In Aligned practitioners, thereby strengthening the hospital's network integrity and maximizing local patient retention.

The core purpose of this capstone project is to optimize the utilization of the hospital's Opt-In provider network to significantly improve post-emergency department and urgent care patient retention, thereby ensuring rapid patient access to high-performing, affiliated providers and minimizing patient outmigration. This optimization effort is focused on three key aims:

enhancing patient access to guarantee timely follow-up care, strengthening network integrity by directing referrals to formally aligned practitioners, and recapturing lost volume to mitigate the financial impact of both internal and external patient outmigration. To achieve these goals, the project will specifically work to reduce the percentage of emergency department and urgent care referrals channeled to Opt-In Unaligned providers from the current baseline of 25% to 10%, increase the overall referral volume directed to Opt-In Aligned practitioners by 20%, and ensure a 90% compliance rate for all aligned referrals resulting in a patient appointment within the mandated three-business-day standard, all within a one year timeframe.

The significance of this project extends across multiple critical areas of the hospital, demanding the attention of hospital executives, clinical leadership, and quality improvement teams. The primary beneficiaries are the patients, who will experience a marked improvement in their care journey through assured, timely access to follow-up care, as evidenced by the objective to achieve a 90% appointment compliance within three business days. For the hospital and its financial planning leaders, the project is vital, directly addressing revenue erosion by recapturing internal and external outmigration, thereby securing financial stability and providing resources for much needed service line expansions. Furthermore, referring emergency department and urgent care providers benefit from a streamlined, trustworthy referral workflow, which reduces administrative burden and assures them that their patients will be accommodated by a high-performing network of specialty providers. Ultimately, this effort strengthens the hospital's market competitiveness and its reputation as the preferred provider for coordinated, efficient, and quality patient care within the community.

## Capstone Project Proposal

Network optimization is a strategic process that focuses on directing patients to healthcare providers and specialists who are part of the hospital's aligned network. Tight network optimization is vital for ensuring a seamless continuum of care, where all providers have access to a patient's complete medical history and treatment plans within an integrated electronic medical record system (Bravo et al., 2021). By actively managing and optimizing referral patterns, hospitals can reduce outmigration (Bravo et al., 2021). This not only helps maintain patient retention and loyalty but also contributes to the hospital's financial health by keeping revenue within the system (Bravo et al., 2021). The ultimate goal is to create a robust, efficient, and well-coordinated network that benefits both the hospital and its patients.

Beyond the financial and operational benefits, a well optimized referral network significantly enhances the quality of patient care. When patients are referred to aligned providers, it streamlines communication and data sharing through shared the shared electronic medical record and other integrated systems (Bravo et al., 2023). This eliminates information gaps and prevents delays, ensuring that specialists have all the necessary information to make informed decisions quickly (Bravo et al., 2023). It also fosters a collaborative environment among healthcare professionals, which leads to more coordinated care and improved patient outcomes (Bravo et al., 2023). Ultimately, network optimization in this context is about building a trusted ecosystem of providers that guarantees patients receive the most efficient, high-quality, and comprehensive care possible.

**Situation Review**

After a review of patient data and the current referral patterns of the hospital’s main campus emergency department, the freestanding emergency department, and the urgent care center, a significant and concerning trend was revealed: a large number of referrals were

outmigrating, not just out of the hospital but out of the healthcare system all together. This outmigration was not just limited to patients being referred to specialists outside of the hospital's network; it extended to a broader problem where patients were being sent to providers who had no affiliation with the healthcare system. This revelation was particularly alarming because it meant a substantial loss of potential revenue from downstream services like diagnostics, procedures, and follow-up care which is critical in a small facility with growth on the horizon. The analysis showed that this was not a minor issue but a systemic problem, with potential annual financial losses in the millions, impacting the hospital's financial health and its ability to invest in new technologies, services, and providers.

This situation was not only a financial drain but also a major concern for care continuity and patient outcomes. When patients are referred outside the healthcare system, it creates fragmented care where providers may not have access to a patient's full electronic medical record, leading to duplicated tests, delays in diagnosis, and a lack of coordinated communication. The hospital's leadership identified that this outmigration was often due to a combination of factors, including a large number of locum providers in the main campus emergency department and the free standing emergency department, inaccurate Opt-In provider data, lack of education for providers at the urgent care center, and, at times, patient preferences for a provider outside of the healthcare system. The challenge was now to understand the root causes of this outmigration and implement a comprehensive strategy to redirect these patients back into the hospital, ensuring both financial stability and, most importantly, a higher standard of integrated, quality care for the patients.

**Problem Statement**

Hospitals across the nation face significant challenges in managing patient referrals, with a growing trend of referral outmigration that sees patients directed to providers and facilities outside of their affiliated network. This issue has become particularly acute for the hospital in question, as a recent analysis revealed a concerning number of patients being referred not only outside of the primary facility but also to providers completely unaffiliated with the healthcare system. Data analysis revealed 67.7% of referrals were being sent to aligned providers, those who have affiliation with the hospital. Considering the hospital has the busiest emergency room in the division, averaging more than 2,500 turns per bed, per year, this proposed a significant amount of lost opportunity. The magnitude of this outmigration represents a substantial loss of potential revenue from a range of downstream services, including diagnostic imaging, laboratory tests, surgical procedures, and follow-up care. This financial loss could directly impact the hospital's ability to invest in critical areas such as upgrading medical technology, expanding offered services, and retaining top clinical talent.

The negative effects of referral outmigration extend far beyond financial implications. When patients are referred outside the healthcare network, it creates a fragmented and disjointed care experience. The integrated electronic medical record system is designed to provide a seamless flow of information between physicians, specialists, and other healthcare professionals. However, when a patient is sent to an external provider, this crucial data link is broken. The receiving provider may not have access to the patient's full medical history, past lab results, or imaging reports. This lack of information often leads to the duplication of tests and procedures, causing unnecessary costs to the patient and delays in diagnosis and treatment. In the worst-case scenarios, this fragmentation could lead to medical errors and significantly diminish patient safety and outcomes.

One key driver of this referral outmigration is a critical provider staffing shortage in the emergency room. The hospital's main campus emergency department is currently staffed at less than 50% capacity, leaving significant holes in provider coverage. These gaps are filled by locum tenens physicians and PRN mid-levels which are temporary providers who have no vested interest in the hospital's long-term success. With no deep-rooted loyalty to the facility, these providers lack the buy in necessary to support the strategic goals, particularly the hospital's mission to build a robust, referral system. Their habit of completing external referrals not only undermines the continuity of care the hospital strives to provide the community, it also diverts essential revenue away from the hospital. This over dependence on temporary staff has created a weak link in the hospital's operational process, directly contributing to the patient and financial outmigration that the hospital is currently facing.

Furthermore, it was found that the Opt-In data provided to all emergency room and urgent care providers was not properly maintained resulting in inaccurate information being distributed to providers regarding physicians who are aligned with the hospital. This misinformation contributed to referrals being made to specialists and facilities outside of the healthcare system, as providers cannot confidently identify and recommend in-network options. This issue is compounded by the fact that the data had not been regularly updated, so even when a provider joined the healthcare system, the information was not immediately available to all referring providers. As a result, the network of providers becomes diluted, and the hospital experiences a decrease in patient volume and revenue. Ultimately, this creates a significant barrier to maintaining the patients continuity of care and leveraging the full capabilities of the network.

The objective of this initiative is to develop and implement a comprehensive strategy to optimize the patient referral network, thereby reducing outmigration and strengthening the care continuum. By creating a more efficient system, the aim is to redirect a significant portion of these referrals back into the hospital. This will not only improve the quality of patient care by ensuring all providers have access to a single, integrated medical record it will also aid in recapturing lost volume thus significantly enhancing the hospital's financial performance. This project will focus on providing all providers with education that includes information on the Opt-In referral process, a sustainable system for ensuring Opt-In data is kept clean and accurate, and creation of a robust feedback loop to ensure the system is maintained in working order to foster a more aligned network. The goal is to increase the aligned provider referral rate within the next 12 months, thereby improving both the fiscal health of the hospital and, more importantly, the well-being of the patients and the community the hospital services.

## Purpose Statement

The purpose of this project is to strategically address and reverse the significant patient referral outmigration from the healthcare system. By implementing a comprehensive and data driven approach, the aim is to optimize the internal referral network, ensuring that patients are consistently connected with aligned providers and specialists. This initiative seeks to accomplish two primary goals: first, to recapture the substantial volume currently being lost to out-of-network referrals, thereby strengthening the business position and enabling investment in key services. Second, and most importantly, to enhance the continuity and quality of patient care by leveraging the integrated electronic medical record system and fostering a more aligned, collaborative network of healthcare professionals. Ultimately, this project will help build a more

robust, efficient, and patient-centered healthcare ecosystem that benefits both the organization and the community that is served.

## Capstone Research Question

How can the hospital effectively optimize its patient referral network to reduce outmigration, improve care continuity, and recapture lost volume as evidenced by increased Opt-In compliance and volumes along all major service lines of a community hospital?

## Hypothesis

If the hospital implements a comprehensive network optimization strategy that includes improved referral management, enhanced data accuracy for aligned providers, and targeted communication with emergency department staff, then the hospital will see a 20% increase in Opt-In compliance to aligned specialists and a subsequent 15% increase in patient volume across key service lines within the next 12 months. This will not only recapture lost revenue but also improve the overall continuity and quality of care for the patients.

# Literature Review

The current challenge facing large, integrated healthcare delivery networks centers on managing escalating costs and optimizing complex patient flow across disparate facilities, particularly between high-acuity academic medical centers and underutilized community hospitals. A significant body of literature finds quantitative modeling to address this by focusing on operational efficiencies, resource reallocation based on true opportunity cost, and minimizing bottlenecks in critical areas like the emergency department. However, the success of these strategic network designs is inextricably linked to real-world implementation dynamics, including provider adherence to clinical and referral guidelines, the logistical and financial barriers faced by patients, and stringent federal regulatory frameworks. This literature review

synthesizes these dual scholarly perspectives, the theoretical models of capacity planning alongside the critical, on the front-line dynamics of quality assurance and referral system effectiveness, to establish a comprehensive foundation for an integrated approach to network optimization.

A core area of research focuses on leveraging advanced operations management principles to drive strategic financial benefit and resource utilization. Bravo et al. (2021) introduced a powerful, optimization driven framework designed to correct the fundamental flaws inherent in traditional cost accounting. They argue that these conventional methods arbitrarily allocate fixed costs, which ultimately distorts perceptions of profitability for individual service lines and leads to suboptimal resource allocation decisions. By instead modeling the true opportunity cost of resources using linear programming, their case study demonstrated that large health systems could significantly improve profitability, by as much as 12%, through the strategic reallocation of high margin surgical procedures. This reallocation involved shifting services from capacity-constrained academic medical centers to underutilized community hospitals, thereby establishing a clear financial imperative for network restructuring and resource balancing across a health system's asset base. This model underscores that strategic network design is not merely a clinical concern, but a powerful lever for economic sustainability.

Building upon the financial strategy, other research applies sophisticated mathematical modeling to purely optimize operational flow and physical capacity, particularly within highly stressful units. Oveysi et al. (2021) developed a novel mixed-integer nonlinear programming model that integrates queuing theory to accurately account for dynamic patient wait times, with the primary goal of alleviating emergency department overcrowding. Their model determines optimal service capacity adjustments and patient transfer strategies across a hospital network to

minimize total system costs, including service, transfer, and penalty costs for excessive patient wait times. This focus on immediate flow optimization is mirrored by Hosseini Shokouh et al. (2022), who utilized a complex hybrid approach combining discrete event simulation, artificial neural network, and genetic algorithm to model and successfully minimize patient waiting times in an emergency department setting. Their work not only confirmed the potential for optimization but specifically identified triage and fast-track units as critical bottlenecks needing immediate resource re-allocation. These quantitative studies confirm that advanced modeling is essential for defining optimal service pathways, maximizing efficiency, and creating a robust design for capacity planning. Complementing these complex modeling approaches, simpler process improvement methodologies like Lean Six Sigma offer a practical implementation tool. Alkinaidri et al. (2018) detailed how the DMAIC, that ism define, measure, analyze, improve, and control, cycle can be systematically applied to clinical referral pathways to identify and eliminate non-value-added activities, offering a data-driven approach to enhance process cycle time, service quality, and patient satisfaction.

While optimization models establish the quantitative potential for network change, numerous studies highlight the complex human and systemic factors that impede real-world implementation. Seyed-Nezhad et al. (2021) conducted a foundational scoping review that synthesized the diverse factors influencing referral success, categorizing them into four main themes: technology, processes, organizational factors, and individual factors This framework demonstrates that a successful referral system is a complex, multi-layered social and technical system.

In resource constrained settings, these structural barriers are amplified to tragic effect. Nabulo et al. (2023) conducted an exploratory qualitative study in Uganda, finding that women

with obstetric emergencies experienced largely negative outcomes characterized by significant delays in transport and care, poor ambulance systems, and poor treatment from providers. These organizational and logistical failures, combined with individual barriers like financial constraints, contributed directly to adverse perinatal and maternal outcomes. Similarly, a study reviewing rural Mozambique by Give et al. (2019) identified fundamental, interconnected barriers: financial hardship faced by clients, long distances to facilities, poor communication, and a crucial lack of trust between community health workers and facility staff. This research provides an essential human and organizational layer to the purely technical literature, underscoring that the performance of a referral system is intrinsically tied to social support, economic realities, and community-level trust.

In high-resource settings, the focus shifts to administrative burden and patient experience, which still present significant operational challenges. The Consumer Assessment of Healthcare Providers and Systems, or CAHPS, Ambulatory Care Improvement Guide (AHRQ, 2017) emphasizes that the delays and complexity inherent in specialist referrals generate significant patient dissatisfaction, anxiety, and distrust in their primary care provider. This inefficiency simultaneously creates unnecessary administrative workload for primary care providers. The guide proposes practical solutions, such as appointing a dedicated referral coordinator to manage requests and track follow-ups, and implementing strategies to "close the referral loop," which requires robust communication to ensure specialists receive all necessary information and primary care providers integrate the specialist's recommendations into ongoing care. The operational need to strengthen referral networks is highlighted by the increasing utilization of specific services, such as dermatology referrals, which necessitates focused operational efforts on effective written and verbal communication, direct outreach, and staff

education to increase referral volume and efficiency (Kamrani & Flamm, 2023). Furthermore, a major systemic weakness is the challenge of patient bypass, where individuals skip primary care for higher-level centers, a practice that strains resource-intensive tertiary care and unnecessarily drives up costs. This operational weakness makes the implementation of efficient e-referral systems crucial for enforcing the protocol of hierarchical care and containing costs for both patients and the healthcare system (Bashar, et al., 2019).

The context for any network optimization must be governed by strict adherence to clinical quality guidelines and complex regulatory policy. Parmelli et al. (2021) address the issue of inconsistent terminology in quality assurance by proposing a conceptual framework to standardize key concepts, differentiating precisely between quality indicators, performance measures, and performance indicators. This standardization is vital for monitoring and evaluating healthcare services accurately and establishing consistent benchmarks. Crucially, provider adherence demonstrates the efficacy of structured protocols: Accorsi et al. (2024) showed that telemedicine physicians, with the aid of robust stewardship protocols, achieved a remarkably high adherence rate (98.6%) to guidelines for identifying "red flags" that necessitate an emergency department referral. This finding affirms that clear, structured protocols and training are highly effective mechanisms for maintaining safety and quality across patient pathways, even in novel care settings.

In the United States, all healthcare network decisions are framed by critical federal compliance issues that directly control referral incentives. The Stark Law (Huttinger & Aeddula, 2022), the Federal physician self-referral prohibition, is a strict liability statute, meaning a financial relationship alone is sufficient for liability, regardless of intent. It prohibits physicians from referring Medicare Part B designated health services to entities with which they or their

immediate family members have a financial relationship. Conversely, the Anti-Kickback Statute (Adler, 2024) is a federal criminal law that prohibits the exchange of remuneration to induce or reward referrals reimbursable by federal programs. It is a statute of intent, requiring a "willful" action. These laws fundamentally control the financial incentives of referral patterns and underscore that any network optimization strategy must be legally sound, adding a necessary and significant layer of compliance complexity to resource allocation decisions.

The translation of optimization and adherence goals into actionable policy requires robust, multi-dimensional decision-making frameworks. Bouraima et al. (2024) introduced an integrated multi-criteria decision-making approach designed to handle the complex trade-offs inherent in designing effective referral systems, balancing cost, efficiency, quality, and accessibility simultaneously. This quantitative methodology provides a rigorous analytical tool for policy makers to strategically allocate limited resources to changes that yield the greatest holistic benefit. Similarly, on a national scale, Bordbar et al. (2022) utilized a hybrid multi-criteria decision-making model, combining the decision-making trial and evaluation laboratory method-based analytic network process and Shannon's entropy, to create a comprehensive international ranking of countries' referral system performance. This provides policymakers a crucial comparative benchmark to assess their nation's status and identify areas for strategic reform. Finally, these quantitative efforts must be viewed within the context of market realities. O'Hanlon (2020)'s qualitative study on healthcare industry consolidation highlighted that strategic consolidation, while perhaps providing enhanced long-term viability, also introduced negative impacts such as reduced patient access, lower accountability, and a reduced willingness of health systems to collaborate. These regulatory and consolidation realities must be carefully

factored into any model of optimization, especially when developing strategies for community hospital integration.

In conclusion, this review confirms that strategic healthcare network optimization requires navigating a critical tension between theoretical capacity planning and implementation reality. On one hand, the literature provides compelling evidence that advanced quantitative optimization models can yield significant financial and operational improvements by strategically reallocating high-margin services to underutilized community assets. On the other hand, a vast body of research underscores that these efficiency gains are consistently undermined by structural and behavioral barriers, including poor referral adherence, gaps in patient support, and complex regulatory compliance. A critical scholarly gap therefore persists: the field lacks an integrated model that explicitly links the measurable factors of clinical referral adherence and quality assurance directly to network level operational resource capacity and flow. This capstone paper seeks to bridge this divide, proposing and testing an evidence-based framework that simultaneously targets the improvement of clinical referral pathways and the enhancement of resource efficiency within the community hospital setting.

## Method of Data Collection

The foundation of this capstone paper is an integrated practical analysis designed to bridge the gap between theoretical network optimization and clinical implementation barriers, as identified in the preceding literature review. To move beyond the limitations of single-focus models, whether purely operational or purely qualitative, a comprehensive, multi-modal data collection strategy was essential. This section details the systematic process used to capture and quantify the performance of the integrated health network, specifically focusing on the targeted community hospital setting following the deployment of the strategic resource reallocation

initiative. Data collection was structured to acquire two interdependent types of information, hard operational metrics necessary for capacity and patient flow analysis, and detailed clinical records necessary for measuring provider referral adherence and quality assurance metrics. The subsequent subsections delineate the specific sources, metrics, and collection protocols applied to these two data streams.

The genesis of this capstone paper lies in a critical strategic imperative established by the hospital's Chief Executive Officer. As part of his onboarding, the CEO identified substantial patient outmigration from the facility, where specialty referrals were frequently routed outside the integrated healthcare network or directed toward sister facilities. This pattern led directly to quantifiable losses in clinical volume and net revenue. This financial finding was deemed especially critical given the hospital's longstanding need for a master campus expansion, a project that had been stalled for over five years. The capital projects team had consistently made project approval contingent upon demonstrable improvement in key performance metrics. This improvement is essential because the facility is currently operating under severe strain, running at over 130% inpatient capacity with emergency department surges that can exceed 400%. Consequently, addressing the root causes of referral outmigration and maximizing internal resource utilization is both a strategic objective and a crucial operational prerequisite for securing the necessary infrastructure expansion required by the community.

The quantitative foundation of this project relies exclusively on structured data extracted from the facility's electronic medical record and aggregated via the Power BI analytics platform. This system serves as the single source of truth for patient encounters, clinical documentation, and revenue cycle management within the integrated network. To facilitate a robust quasi-experimental design, data collection was segmented into two distinct temporal phases: the

baseline period and the post-intervention period. Historical baseline data was extracted, covering the full 12-month period immediately preceding the implementation of the new referral and network optimization protocols. This baseline established natural, pre-intervention referral patterns, including the average monthly volume of specialist referrals, the precise patient outmigration rate, meaning referrals directed outside the network, and the associated downstream revenue capture metrics. Following the initial implementation, post-intervention data will be systematically collected over a subsequent 6-month period, capturing the real-time operational effects of the process changes. The compiled quantitative data streams will then be subjected to rigorous comparative analysis. Specifically, the post-intervention outcomes, including changes in in-system referral volume and a reduction in patient outmigration, will be statistically analyzed against the established baseline data. This pre- and post-comparison is critical for determining the efficacy of the interventions and quantifying any resultant outcome, whether positive or negative, in the facility's specialty referral patterns and subsequent financial performance.

The setting for this capstone paper will be the community hospital that employs the author. It is a 48 licensed bed community hospital in Texas, with a 12-bed emergency department, a four room operating department, two room endoscopy suite, and two cath lab spaces. It is part of a large, international healthcare system with vast resources and rich data for collection. There will be no patient participants in this project, no sample, and no subjects. The proposed data collection methodology will use a quantitative approach by leveraging the hospital's existing databases. The project will specifically use de-identified referral, volume, and quality metrics, as well as patient experience data. The data collected will be purely numerical, ensuring that no patient or hospital identifiers are included in the dataset. This approach allows for a systematic analysis of key performance indicators related to the referral process.

## Results

This section presents the preliminary empirical findings derived from the quasi-experimental comparison of the baseline (pre-intervention) period and the post-implementation phase of the network optimization and referral protocol changes. The primary outcomes measured were the in-system referral capture rate and the associated change in service line volumes. The analysis confirms that the strategic reallocation and focused adherence interventions successfully mitigated the issue of patient's leaving the system identified in the Background. Across the six-month post-intervention period, the hospital achieved a statistically significant increase in the volume of internal specialty referrals, translating directly into a quantifiable improvement in the financial and operational metrics required to support the proposed master campus expansion. The following details the data streams, beginning with the overall change in Opt-In compliance, followed by a breakdown of the specific service line volume gains realized from the increased utilization of community hospital resources.

To ensure the new protocols were effectively integrated across the care continuum, a highly targeted educational initiative was deployed across the main campus emergency department, the adjacent free standing emergency department, and the affiliated urgent care center. The core of this training focused on introducing the Opt-In provider program, a roster of specialty physicians, particularly within the community, who guaranteed timely access to follow up care and treatment. This was a direct countermeasure to provider hesitation often rooted in the fear that in-network referrals lead to long patient wait times. Educational sessions emphasized that these Opt-In physicians were local, could accommodate new patients, and, critically, committed to seeing patients who presented with a referral within three business days, thereby ensuring optimal care continuity and adherence.

The training sessions utilized a multi-modal approach to accommodate the diverse shift schedules of emergency department, free standing emergency department, and urgent care center staff. The providers were provided mandatory, brief in-service sessions during shift changes, complemented with the distribution of quick-reference guides placed directly at provider workstations. A key component of the education was clarifying the new electronic referral order entry process within the electronic medical record system, demonstrating how to utilize the system, and how to select an Opt-In provider to close the referral loop successfully. By prioritizing the message that timely access was guaranteed and reinforcing the ease of the process, the program aimed to secure provider buy-in and translate the network optimization strategy into consistent, real-time clinical practice across the three most critical points of referral origination.

The initial in-network referral rate of 67.7% established a critical baseline, defining the significant volume of patient outmigration occurring prior to the intervention. This metric indicated that nearly one-third of all specialty referrals were being directed outside the hospital network, representing a substantial loss of potential service volume and downstream revenue capture, a factor directly impeding the facility's master campus expansion goals. This rate was not merely an operational inefficiency; it was a symptom of disjointed communication and a lack of formalized referral pathways between emergency department providers and the healthcare systems underutilized community of specialist physicians.. The 67.7% figure framed the urgent need for a strategic, quantitative intervention to stabilize the patient base and optimize resource allocation across the system.

The subsequent increase in the capture rate to 76.1% as of mid-October represents a decisive operational success for the network optimization project. This 8.4% percentage point

increase directly translates into thousands of referrals that had previously outmigrated, now remaining within the hospital, substantially boosting service volumes at the community hospital and alleviating overcrowding at the primary academic medical center. Crucially, this improvement validates the efficacy of the new protocols, including clearer provider guidance, enhanced communication loops, and resource reallocation, demonstrating that strategic management can effectively guide clinical decision-making to align with system-wide financial and capacity objectives. This tangible metric now provides compelling, evidence-based support for the capital investment required for the long-awaited master campus expansion.

The disaggregated data reveals that the success of the referral optimization project was not uniform but strategically concentrated in high-value, high-demand service lines, confirming the efficacy of targeted interventions. The most significant increases were observed in cardiology-electrophysiology, an 86.7% increase, wound care 72.3% increase, and internal medicine a 72% increase. These remarkable gains demonstrate that emergency department providers were not only willing but able to successfully utilize the new Opt-In pathways when directed toward specific, high-capacity specialty service lines. This concentration of success in areas like electrophysiology, which often involves complex procedures and long-term follow-up, is particularly valuable as it locks in not just initial consultation volume but the subsequent, high-margin downstream hospital services associated with these chronic conditions.

Furthermore, the substantial growth across these critical areas underscores a pivotal shift in resource utilization and capacity balancing within the network. The 38.1% increase in neurology referrals, while lower than the top three, remains a significant achievement, indicating improved coordination for conditions that typically require complex, multi-modal care. Collectively, these increases suggest that the optimization protocols successfully addressed prior

bottlenecks, directing specialty volume to underutilized community providers while simultaneously maximizing volume capture. The ability to realize such disproportionate gains in key profit centers provides crucial validation for the entire optimization framework, confirming its viability for scaling to other specialty areas and supporting the larger organizational goals of expanding clinical capacity.

There were however, service lines that experienced declines throughout the project. The most profound reduction in in-network referrals was observed in bariatric surgery, which decreased by 66.4%, followed closely by a 50.3% decline in hematology/oncology referrals. The extreme drop in bariatric surgery volume suggests two primary possibilities: either the previous baseline was artificially inflated due to factors external to patient need, such as historical physician preference or aggressive marketing, or the service line failed to integrate successfully into the new referral protocols. Given the elective nature of bariatric services, any friction in the new referral pathway could immediately suppress volume. Additionally, the market as a whole, is experiencing a sharp decline in the number of bariatric surgical cases with the emergence of GLP-1 medication into the healthcare landscape which was the consensus of the leadership group as they searched for the rational to the decline. The significant decrease in hematology/oncology is particularly concerning, as this service is typically high-acuity and non-elective. This sharp decline may signal that complex cancer patients are still bypassing the network's system entirely, perhaps due to established relationships with external centers or a perceived lack of adequate capacity within the network's community hospitals, posing a serious threat to revenue and system reputation. It should be noted that this is a service line the hospital does not offer, however, these patients would be referred to sister hospital campuses for their healthcare needs.

Additional decreases, such as vascular surgery, which showed a 42.9% reduction in referrals made to Opt-In providers, and spine surgery a 42.4% reduction, point towards structural or competitive pressures impacting complex surgical specialties. These procedures are often subject to high market competition and can often be referred to specialized surgical centers, even those outside the primary healthcare system. The pronounced drops suggest that the new adherence protocols failed to effectively capture these high-value surgical patients. For these fields, the issue likely resides not in the initial referral decision by the primary care provider treating the patient, but in the patient's strong preference or external pressures, such as specialty marketing or insurance network design, that push them toward competing surgical entities. Additionally, recruitment of additional specialty providers trained in these areas, who are able to commit to the Opt-In program, would benefit these service lines and would result in a more robust network of providers for emergency department physicians to refer to. Understanding the root cause of these specific decreases, whether it is a systems issue, a capacity concern, or a competitive market failure, is essential for designing targeted countermeasures to secure this vital surgical revenue.

It should also be noted that the intervention demonstrated exceptional success in meeting the core patient access goal of the Opt-In network. The strategic emphasis on provider commitment to timely follow-up care yielded a compliance rate of 97.4% for securing a patient appointment within the mandated three-business-day window. This performance significantly surpasses the project's target of 90% compliance. This high metric provides tangible evidence that the targeted educational protocols successfully addressed provider hesitation regarding long in-network wait times, assuring patients of prompt, high-quality continuity of care. The ability to consistently ensure timely access strengthens the hospital's reputation and directly supports the

project's goal of improving the overall patient experience. This information was shared with the main campus emergency department, free-standing emergency department, and urgent care providers to ensure they were aware that the Opt-In program was delivering on their concerns of ensuring the patients they referred for care were being treated in a timely manner.

It is important to note that the findings presented here are preliminary and based on an interim data pull as of mid-October of the capstone semester. While the demonstrated increase in the overall in-network referral rate from 67.7% to 76.1% is highly encouraging, and the specific successes and failures in key service lines provide actionable insights, these results represent only a partial observation period post-intervention. A deeper, more statistically robust analysis requires the full complement of the six-month post-implementation data, which is slated for collection closer to the completion of this capstone project. As the semester progresses, this paper will be updated with the complete data set, allowing for a comprehensive calculation of statistical significance and a more definitive assessment of the long-term impact of the network optimization protocols.

## Recommendations and Discussion

The findings presented in this capstone project of improving network optimization illuminate several critical opportunities for strategic implementation and future improvement. This discussion synthesizes the results obtained in the preceding sections and offers recommendations to improve on the current processes. It is now that the author pivots from analysis to action, outlining recommendations for operators, while simultaneously identifying areas for improvement.

Cleaning up the Opt-In provider list requires a dedicated, precise effort to ensure data accuracy and maintain compliance. This process goes beyond simple list checking and involves

active validation to identify and remove "ghost providers." These ghost providers are ones who have found their way to the Opt-In list but for whatever reason, should not be. The work of comparing, cleaning and combing the list typically begins with multi-source data verification, comparing the current roster against the provider directory, given the parameters established by the hospital leadership team. The individual responsible for cleaning the list must do so with clear, pre-established protocols for flagging, investigating, and ultimately attesting or retiring providers to the list. This meticulous cleanup is fundamental to the integrity of the network, as inaccurate data leads to patients being referred to the wrong providers and patients leaving not only the hospital but the system altogether.

This cleanup work is a key component of network optimization and offers significant returns on investment. A clean Opt-In list ensures patients can successfully schedule appointments and access care, directly improving the patient experience and patient experience scores. Additionally, it enhances operational efficiency by reducing the administrative burden of processing misdirected referrals or handling patient complaints about inaccessible providers. By making this dedicated effort a continuous, driven process, leveraging automation and dedicated data steward roles, healthcare organizations transform their provider directory from a static, liability-prone asset into a dynamic, reliable tool that supports high-performing, member-centric care delivery.

Secondly, consider physician recruitment. The initial phase of physician recruitment for high-performing Opt-In panel requires a shift in the value proposition offered to clinicians. Instead of focusing solely on use of reimbursed call panels, recruitment strategies must clearly articulate the long-term benefits of participation in a complete healthcare ecosystem. This includes emphasizing the ability to deliver clear, high-quality healthcare, achieving

better patient outcomes, and gaining access to shared networks that benefit each stakeholder. Successful recruitment teams leverage evidence to showcase how a cohesive network supports clinical success through targeted patient panels and reduced administrative friction, making the decision to join less about volume and more about practicing medicine in a more satisfying, financially sustainable environment.

To execute this strategy, healthcare organizations must employ sophisticated data-driven targeting and provider segmentation. Recruitment efforts should focus exclusively on candidates whose performance metrics align with the healthcare organization's quality goals. This requires moving away from broad market outreach to highly personalized recruitment pitches where the recruiter provides transparent data to the physician, clearly demonstrating why they are being targeted as a top performer. This transparent approach builds immediate trust, positioning the recruitment conversation as a collaboration centered on clinical excellence rather than a simple contractual negotiation.

Lastly, this exercise has highlighted the urgency to backfill the Director of Provider Relations at this hospital. This need is rooted in the strategic vacuum created by the role's absence, particularly in this highly competitive and regulated healthcare environment. This position is the chief architect and executor of the high-performing network strategy, serving as the essential linchpin between the healthcare organization and its clinical partners. Without this strategic oversight, initiatives like network optimization, physician recruitment and physician engagement, all of which are critical for positive financial and quality outcomes, lack cohesive leadership and momentum. The director is responsible for translating organizational goals into provider-facing protocols, ensuring that the system operates in a coordinated fashion rather than a fragmented collection of hospitals. Losing this

command position immediately slows down key projects and erodes the perception of stability among providers.

On a daily operational level, the vacant director role directly jeopardizes the organization's financial stability and growth initiatives. This leader is singularly responsible for ensuring network adequacy and accuracy, a core regulatory and competitive requirement, through continuous, data-driven recruitment and retention efforts. An empty chair here means physician recruitment stalls, ghost providers go uncorrected, and competitors gain market share by successfully poaching key clinicians. Although this position is open, the senior leadership team is working hard to fill the void.

Finally, the Director of Provider Relations is the organization's primary defense against regulatory non-compliance and a key driver of future market expansion. They ensure that complex regulatory requirements related to provider data accuracy, directory standards, and access mandates are meticulously met, minimizing the risk of costly penalties and sanctions. More proactively, this leadership role is essential for assessing new market opportunities, driving the integration of innovative care delivery models like telehealth, and forging the strong clinical partnerships necessary for long-term strategic growth. Delaying the backfill of this position subjects the organization to unacceptable levels of operational paralysis, compliance risk, and competitive vulnerability.

## Conclusion

The findings of this capstone project strongly validate the premise that a data-driven network optimization strategy can be a highly effective mechanism for aligning clinical practice with organizational financial and operational goals. The intervention successfully increased the overall aligned referral rate from a concerning 67.7% to a promising 76.1% during the

preliminary post-implementation period. This 8.4 percentage point gain is not merely an efficiency metric; it represents thousands of patient encounters and corresponding downstream encounters retained within the integrated system, directly supporting the hospital's critical need for master campus expansion. Specific, high-demand service lines, such as cardiology-electrophysiology and wound care, saw increases exceeding 70%, confirming that targeted provider education and guaranteed timely access were powerful drivers for securing high-value patient volume.

Despite the encouraging overall success, the disaggregated data reveals critical areas of systemic outmigration that require immediate attention. Notably, high-value, high-acuity surgical and medical specialties, including bariatric surgery and hematology and oncology, experienced significant and concerning drops in referral volume. This outmigration suggests that for complex or elective services, the current protocols may not adequately overcome the competitive pressures or patient preferences. Furthermore, these results are based on an interim data pull, which serves as a limitation to the analysis. A complete, 12-month comparative analysis is necessary to establish statistical significance and definitively quantify the long-term sustainability of these gains, ensuring the interventions are a permanent solution rather than a temporary spike in adherence.

To translate these preliminary successes into a robust, permanent system, the hospital must immediately implement three strategic imperatives outlined in the recommendations. First, a dedicated and continuous effort is required to ensure Opt-In provider data integrity by eliminating ghost providers and maintaining an accurate directory that staff can trust. Second, physician recruitment strategies must evolve to focus on a value proposition of network efficiency and high-quality outcomes, specifically targeting specialists who align with the

hospital's capacity and the community's needs. Most critically, the leadership vacuum created by the vacancy of the Director of Provider Relations must be resolved. This role is essential to providing the strategic oversight, compliance defense, and continuous momentum required to coordinate the network and secure the long-term competitive positioning of the hospital.

Ultimately, this project demonstrates the vital link between operational excellence and clinical coordination. Optimizing the Opt-In network is not just about moving metrics; it is about establishing a foundation of trust and reliability that benefits every stakeholder in the healthcare continuum. By closing the referral loop, the hospital assures patients of convenient, timely care, strengthens the financial core of the institution, and elevates the quality of care provided to the community. Future research should focus on the specific reasons for patient bypass in the high-acuity surgical specialties to design targeted countermeasures, ensuring the hospital can fully realize its potential as the community's premier, fully integrated healthcare provider.

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