The Good and Bad of Regionalizing Colon Cancer Care

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Abstract

Hospitals in the United States continue to merge into expanding hospital networks. As the U.S. health care landscape rapidly evolves toward regionalized hospital networks, there is a critical opportunity for these networks to fulfill their clinical potential toward coordination of care, particularly for cancer patients. While regionalization aims broadly to improve care by distributing services optimally, centralization remains the dominant approach. This article explores regionalization and centralization specific to colon cancer care. We examine the benefits and drawbacks of centralization of colon cancer surgery as a strategy to enhance patient outcomes and access to care. Additional methods for optimizing regional care delivery also exist. In this article, we also present additional strategies for improving regional care delivery and clinical integration for colon cancer patients.

Keywords
- regionalization
- centralization
- access to care
- colorectal surgery
- rural surgery

The dominant trend in U.S. health care today is hospital consolidation into ever-expanding hospital networks. How this changing landscape will impact cancer outcomes remains to be seen. These emerging hospital networks present a unique opportunity for broader regionalization of cancer care. For example, there is potential to enhance care coordination, reduce fragmentation, and optimize the site of care for best surgical and oncologic outcomes. In this narrative review, we seek to define key concepts informing regionalization and potential strategies, such as centralization, as they relate to colon cancer. We explore the advantages and disadvantages of centralizing colon cancer care within the context of contemporary scientific evidence. Finally, we describe other strategies that may be employed to balance quality, access, and patient-centered approaches to optimizing colon cancer care delivery across regional hospital networks.

What Is Regionalization?

Regionalization of health care involves organizing networks of structures, resources, and practitioners to serve a defined geographic area. The goal is to provide cost-effective, high-quality care to all individuals within this area. Countries such as England, Canada, and Brazil have established nationwide regionalized health care systems.[1] In contrast, regionalization in the United States has been limited due to the fee-for-service market-based system. Examples of regionalized health care systems in the United States have been limited to acute care for conditions such as trauma, burn, stroke, and acute coronary syndrome, and for neonates requiring intensive care.[2] Unlike the comprehensive national systems in other countries that have established structures to coordinate care delivery, the current U.S. regionalized systems rely on interhospital agreements for standards of care, data collection, and resource coordination.[2]

Over the past two decades, U.S. hospitals have increasingly merged into multihospital networks, offering a critical opportunity for further regionalization within existing health care structures. Hospital consolidation (represented by mergers and acquisitions) has primarily been driven by economic factors, rather than clinical motivations,[3,4] for example, increasing bargaining power to negotiate with payers and

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boosting referrals from broader catchment areas to increase revenue.[5,6] Costs are also reduced through shared infrastructure (e.g., billing) and by shifting patients toward facilities with excess capacity. Further, by having a diverse portfolio of hospitals, hospital networks are buffered against shifting policy landscapes.[7,8] Although marketed as improving care quality, the impact of hospital consolidation on patient outcomes has been inconsistent.[9–11] For example, disease-specific outcomes, including colon cancer, vary widely among hospitals within a single system.[11–14]

Many regional models use a hub-and-spoke design, with a central hub (often an academic medical center) and smaller spoke hospitals (typically community hospitals). This model often leverages **centralization** to concentrate expertise, resources, and patients at the hub hospital where more complex care is delivered.[1] Centralization should be distinguished from regionalization: centralization represents one strategy that may be employed by health networks to deliver regionalized care. In contrast, regionalization may encompass any combination of many potential strategies to coordinate care for patients living within the captured region. Centralization is beneficial for complex or rare conditions. For colon cancer, which is the third most common cancer affecting 1 in 24 U.S. adults, the question becomes whether centralization remains advantageous or whether other regionalization strategies may provide greater benefit.

The "Good" of Centralization for Colon Cancer Surgery

By leveraging the volume–outcome relationship, centralization of complex cancer surgery has been shown to reduce perioperative mortality and improve long-term outcomes for complex cancers such as rectal, esophageal, and pancreatic cancer. Hospital ranking bodies like The Leapfrog Group have established volume standards for hospitals performing high-risk cancer operations (e.g., proctectomy, esophagectomy, and pancreatectomy), but no benchmarks exist for common operations like segmental colectomy for colon cancer. Studies indicate that stage-for-stage colon cancer survival is higher at high-ranking cancer hospitals as compared with their brand-sharing affiliates.[12–14] However, most colon cancer surgeries are currently performed at lower-volume spoke hospitals.[12,15] Thus, centralizing colon cancer surgery may offer several advantages, including better perioperative outcomes, improved coordination of multidisciplinary care, and more efficient use of resources (►**Fig. 1**).

Improved perioperative outcomes. High-volume hospitals may achieve better surgical outcomes by honing operative techniques, decision-making, and perioperative care. For example, centralizing ovarian cancer treatment in France increased complete tumor resection by 15 percentage points. Notably, the largest relative benefit was in the decision-making to pursue neoadjuvant therapy rather than a surgery-first approach.[16] Similarly, higher surgical volumes correlate with lower failure-to-rescue rates after postoperative complications, suggesting that high-volume hospitals may have more resources to recognize and address postoperative complications than low-volume counterparts.[17] Notably, these findings have been modest and inconsistent for colon cancer operations.[18–20]

Enhanced multidisciplinary care coordination. Effective colon cancer care requires coordination among multiple specialists, including surgeons, oncologists, radiologists, pathologists, and others. As readers can anecdotally attest, centralizing care facilitates this coordination as it is easier to coordinate complex care among co-located specialists with efficient communication streams via shared electronic health records (EHRs). For colon cancer, this may mean that biopsy specimens can undergo pathologic review on-site, appropriate testing (e.g., mismatch repair protein status) can be performed immediately, and unnecessary time is not spent requesting or re-reviewing external imaging. Despite these anecdotal experiences, it remains unclear whether care in a cancer center decreases (or in fact increases) the time to treatment.

Concentrated resources for cost efficiency. Centralization can theoretically reduce costs through site specialization, by concentrating costly technology and expertise in one location, rather than paying the costs to supply these for every hospital.[21] Thus, efficient care delivery should, theoretically, cost less. However, centralization can also create monopolized markets, which has been shown to increase the cost of care.[22] Additionally, these increased costs may shift to patients who must travel to centralized locations.[21]

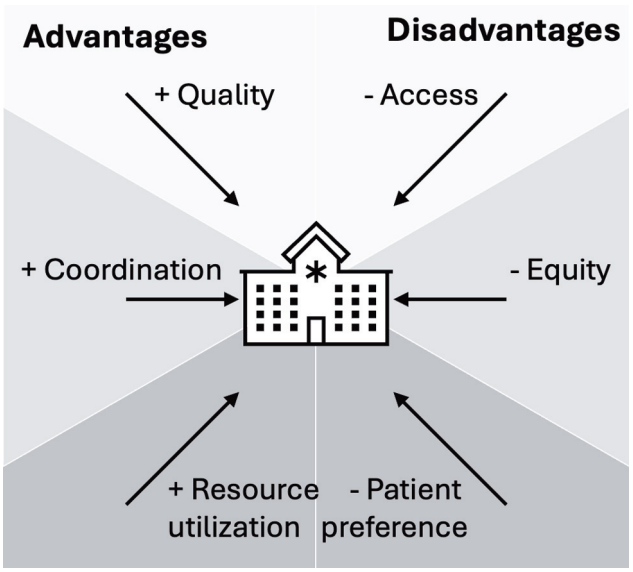

Fig. 1 Goods and bads of centralizing colon cancer care to a hub hospital. For many cancer types, benchmarking organizations suggest that operative resection should only be performed in a high-volume hospital. In the era of regionalized health care via hospital networks, there are both advantages (goods) and disadvantages (bads) to centralizing colon cancer care, given the surgical volume and complication profile.

The "Bad" of Centralization for Colon Cancer Surgery

Despite the potential benefits, contemporary evidence supporting centralization for colon cancer operations has been mixed.[22–25] For example, no association has been found between the degree of centralization within existing hospital networks and morbidity, mortality, or readmission rates after colectomy for colon cancer.[23] Further, centralization assumes patients can and will travel for care and that high-volume hospitals have the capacity to accommodate care for the additional patients to be transferred in a timely manner. Addressing these challenges is critical to ensure regionalization strategies deliver on their intent without violating patient preference, exacerbating inequities, or delaying care (►**Fig. 1**).

Patient preference and barriers to travel. Policies misaligned with patient preferences will be less effective. For example, only about half of surveyed patients were willing to travel hours for care at a high-volume center, even when presented with higher long-term survival rates. Prior studies have corroborated these findings reporting nearly 1 in 10 patients who would choose a local hospital with higher surgical mortality rates.[26,27] Barriers such as travel or accommodations may be addressable, but comorbid health conditions and other nonmitigatable factors also play a role.[26] A balanced assessment including the patient perspectives of centralized colon cancer care is necessary to guide organizational strategy among regionalized hospital networks.

Exacerbating inequities. Centralization may worsen existing inequities if some patients can travel for care, while others cannot due to limited transportation, financial resources, social support, or other barriers. Lower-income or nonwhite race patients are less likely to travel for surgery at a specialty cancer center.[28] Further, specialized centers, often in urban or suburban areas, limit access for rural patients. When patients receive their colon cancer operation far from home, the geographic separation can also complicate postoperative coordination between the specialized center and outpatient providers, leading to disruptions or delays in care, thereby perpetuating inequities even among those able to travel.

Inadequate capacity and care delays. If high-volume hospitals fail to expand their capacity to meet the increased demand, centralization may delay colon cancer care. Specialty clinics, diagnostic testing, operating room time, and bed availability at academic hubs are often at capacity. Increasing patient volumes may result in longer wait times for appointments, diagnostic tests, and operations. Thus, larger hub hospitals may struggle to balance the resources required for routine cases with those needing more complex expertise and resources or emergent cases that are more suited at the tertiary center.

Strategies to Optimize Regional Care Delivery and Clinical Integration for Colon Cancer

Colon cancer is common, with well-established guidelines and varying clinical complexity. Beyond centralization, other regional strategies can aim to deliver "the right care in the right place at the right time." These strategies outlined in the following section include integrating service line delivery, optimizing the site of care, and disseminating expertise and resources (►**Fig. 2**).

Integration of service line care delivery. Regional care for colon cancer can benefit from integrating clinical service lines, where care is standardized across sites, information is freely shared, and quality is continuously assessed. Federal mandates support EHR interoperability of medical records between sites across a hospital network, promoting care coordination with robust communication among geographically dispersed providers. EHR integration facilitates the sharing of diagnostic findings and may eliminate redundant workups across care transitions. Further, EHR integration can allow for the implementation of standardized best practices through EHR-based interventions and continuous quality monitoring to identify areas for improvement.

Site of care optimization. Site of care optimization refers to aligning patient needs and disease complexity with the capacity and resources of each facility. Some patients may be over-triaged to specialized centers with more expertise than they require, while others may be under-triaged to facilities lacking the necessary experience. For example, a young healthy patient with a localized mid-sigmoid neoplasm can be treated safely at a smaller spoke hospital, preserving capacity at the hub. Conversely, an older patient with cardiac disease on systemic anticoagulation with right-sided colon cancer invading the duodenum could undergo local staging workup but should have perioperative planning and surgery at the hub hospital where multidisciplinary

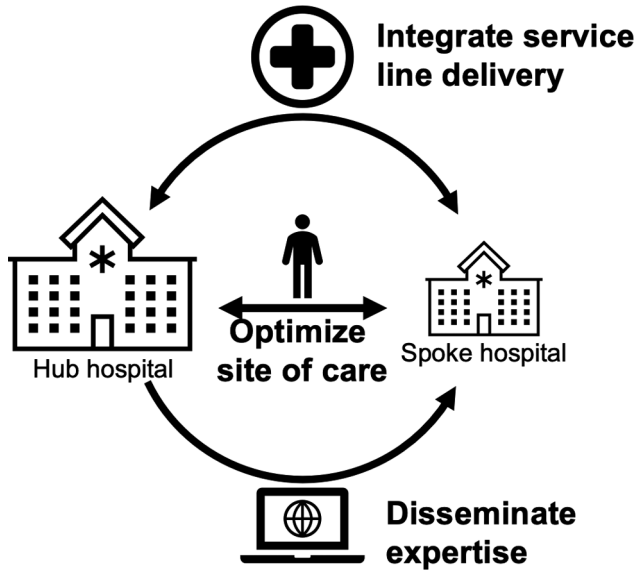

Fig. 2 Potential alternative strategies to centralization for regionalized colon cancer care. Uniform centralization may not be advantageous for common disease types such as colon cancer. Instead, opportunities include integrated service line delivery for coordinated care across sites, optimization of site of care through selective centralization of patients, and dissemination of expertise via technology-enabling services. These approaches may balance equity, access, and patient preference while ensuring high-quality care across regional hospital networks.

surgical specialists work together routinely to achieve the best oncologic outcome. Unlike centralization, this approach keeps most patients local. Like centralization, barriers remain for patients requiring travel to the hub hospital; however, because the number of patients is limited, this approach may allow for greater allocation of resources toward supporting their travel.

Dissemination of clinical expertise. Sharing expertise across sites can elevate the level of care across the hospital network.[29] Telehealth, which grew significantly during the COVID-19 pandemic, can facilitate initial consultations and routine postoperative follow-ups for patients who underwent surgery at hub hospitals. Beyond patient-to-provider communication, telehealth may also enhance provider-to-provider communication via virtual teleconsultation. For example, the Extension for Community Healthcare Outcomes (ECHO) Model (Project ECHO), supported by Congress in 2016, allows disease-specific consultants to regularly discuss patient cases with rural primary care teams. Multidisciplinary tumor boards can also integrate expert opinions across various sites to enhance knowledge sharing, decision-making, and site of care selection for complex cases. These strategies bridge expertise gaps at sites of care with greater capacity, provide evidence-based strategies to treat complex care at more locations, and reduce costs and travel burdens for patients.

Conclusion

The U.S. health care landscape is rapidly evolving toward regionalized hospital networks, creating an opportunity for these networks to fulfill their clinical potential. While centralization is an effective strategy for many complex cancers, its costs may outweigh the benefits for colon cancer due to the higher volume and variation in complexity. However, strategies like service line integration, centralization of select patients, and dissemination of expertise through technology can help mitigate fragmentation in cancer care. These approaches are crucial for improving the quality, access, and equity of colon cancer care delivery.

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Conflict of Interest
None declared.

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