

What is the Strategic Value of NCI Designation to Health Systems?

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Introduction

In 2015, the Winship Cancer Institute at Emory University earned the prestigious Comprehensive Cancer Center designation from the National Cancer Institute (NCI), making it one of 69 NCI-Designated Cancer Centers (NCICCs) in the country, and one of only 49 to be recognized as “Comprehensive” by the NCI. A shotgun blast of accolades and laudatory claims immediately followed – from Emory University leaders to cancer luminaries to political heavyweights.

The extolling remarks that rained down on Emory’s Winship Cancer Institute following their achievement of NCI Comprehensive Cancer Center status mirror similar claims made by nearly all NCICCs across the country (Emory just happens to be a recent example). Their claims boil down to a very simple premise: “We are NCI-Designated, and therefore we are the best.” Like an NFL Quarterback who isn’t considered “elite” until they’ve been crowned Super Bowl champion, many in the cancer community believe a cancer program cannot be preeminent without NCI-Designation.

But, from the perspective of the broader health system, what is the actual value of NCI-Designation beyond the associated reputation and brand appeal? Are NCICCs better positioned strategically and financially than non-NCI designated cancer providers, and what are the measurable benefits of NCI-Designation that cannot otherwise be attained through other investments and initiatives? Based on conversations we’ve had with many health system CEOs, it does not appear that the value of NCI-Designation has ever been quantified through a strategic lens.

This article attempts to address a very fundamental question: What is the strategic value of NCI-Designation to a health system as defined by its ability to influence two key variables: 1) Scale (i.e., volume and market share) and 2) Impact (i.e., outcomes and research).

Defining “Strategic Value”

The designation process is rigorous and can take years – some cancer centers spend the better part of a decade building their programs to the level of NCI-status. Additionally, the level of investment required to support NCI-Designation “readiness” is substantial – in some cases requiring an investment of \$50 million or more. But, from the perspective of a health system, what are the *strategic* benefits derived from this considerable investment?

If you ask this question to ten different health system executives, whether they belong to a health system with an NCICC or not, you are likely to get ten different answers. Some will argue that admission to this fraternity of elite cancer centers, alone, is worth the investment – enhanced recognition and

prestige is the value-add. Others may argue that NCI-Designation is a “political priority” for the institution and/or their state, while still others may argue that designation “casts a halo” across their academic mission and instills greater patient confidence.

Many of these perceived benefits are valid but are hard to quantify. In an era when resources are increasingly limited, health systems are forced to rationalize each strategic investment against numerous competing priorities. This requires an evaluation of the measurable strategic benefits associated with each investment.

In the sections that follow, we attempt to analyze the strategic value associated with NCI-Designation by evaluating the role that it plays in influencing two key strategic variables:

- 1) **Clinical Scale:** The ability to achieve dominant cancer enterprise scale and market positioning relative to competing cancer providers in the market.
- 2) **Impact:** The ability to perform superior clinical performance and research depth relative to competing cancer providers in the market.

Variable 1: Clinical Scale

If NCICCs are the nation’s preeminent cancer institutions, then it stands to reason that they should also be the biggest – right? It is not uncommon for health system executives to accept this hypothesis at face value – that there is a direct link between NCI-Designation and scale.

Each year, approximately 250,000 patients receive their cancer diagnoses at an NCICC.¹ Although NCICC’s represent fewer than 5% of all accredited cancer program in the United States², almost 15% of all new cancer cases in the United States are diagnosed and/or receive care at an NCICC.³ On the surface, this is an impressive statistic; however, it implies that more than 8 out of 10 cancer patients in the United States still receive their care in a setting other than an NCICC.

This begs the question: Do NCI-Designated Cancer Centers truly achieve superior scale and market share relative to other cancer providers? Or, can other cancer providers effectively compete against NCICCs for market share, indicating that cancer program scale isn’t necessarily a function of designation status?

To address this question, we have analyzed tumor-specific discharge data reported to State Inpatient Databases from different regions across the country. Looking at medical and surgical inpatient discharges for patients with a primary diagnosis of cancer, we can compare tumor-specific oncology inpatient market share of NCICCs to non-NCICCs within the regions analyzed. Although inpatient data is not a perfect indicator of oncology market share (for example, breast cancer is primarily an outpatient

1. <https://www.cancer.gov/research/nci-role/cancer-centers>
2. <https://www.facs.org/quality-programs/cancer/coc/apply>
3. <https://www.cancer.org/research/cancer-facts-statistics/all-cancer-facts-figures/cancer-facts-figures-2018.html>

disease), it is the best publicly-available resource and tends to paint a directionally accurate market share picture for most tumor programs.

The following tables provide a breakdown of oncology inpatient market share by tumor site for five disparate markets across the United States – Atlanta, Baltimore, New York State (excluding NYC), Los Angeles, and St. Louis – all of which include at least one NCICC.

Table 1: Greater Atlanta
Includes Fulton, DeKalb, Gwinnett, Cherokee, Cobb, Clayton, Coweta, Douglas, Fayette, Forsyth, Gwinnett, Henry counties)

Tumor Site	#1 Health System Market Share Leader	#2 Health System Market Share Leader	#3 Health System Market Share Leader
Breast	35% (Non-NCICC)	15% (NCICC)	14% (Non-NCICC)
Colorectal	12% (Non-NCICC)	9% (Non-NCICC)	8% (Non-NCICC)
Thoracic	22% (NCICC)	18% (Non-NCICC)	13% (Non-NCICC)
Prostate	34% (Non-NCICC)	17% (Non-NCICC)	12% (Non-NCICC)
GI (non-colorectal)	29% (NCICC)	15% (Non-NCICC)	12% (Non-NCICC)
GU (non-prostate)	20% (NCICC)	18% (Non-NCICC)	16% (Non-NCICC)
Blood (malignant hem)	31% (NCICC)	22% (Non-NCICC)	12% (Non-NCICC)
Other Rare & Complex	26% (NCICC)	16% (Non-NCICC)	11% (Non-NCICC)
Total	14% (Non-NCICC)	13% (NCICC)	10% (Non-NCICC)

Source: 2015 Georgia State Hospital Discharge Data

Table 2: Greater Baltimore
Includes Anne Arundel, Baltimore, Baltimore City, Carroll, Harford, Howard, Queen Anne's Counties

Tumor Site	#1 Health System Market Share Leader	#2 Health System Market Share Leader	#3 Health System Market Share Leader
Breast	18% (Non-NCICC)	14% (Non-NCICC)	11% (Non-NCICC)
Colorectal	20% (NCICC)	18% (Non-NCICC)	13% (Non-NCICC)
Thoracic	20% (Non-NCICC)	16% (NCICC)	16% (NCICC)
Prostate	N/A	N/A	N/A
GI (non-colorectal)	25% (NCICC)	19% (NCICC)	14% (Non-NCICC)
GU (non-prostate)	27% (NCICC)	22% (NCICC)	9% (Non-NCICC)
Blood (malignant hem)	27% (NCICC)	17% (Non-NCICC)	15% (NCICC)
Other Rare & Complex	29% (NCICC)	16% (NCICC)	14% (Non-NCICC)
Total	24% (NCICC)	15% (NCICC)	12% (Non-NCICC)

Source: 2014 Maryland State Hospital Discharge Data

Table 3: Greater Los Angeles (includes Kern, LA, Orange, Riverside, San Bernardino, Ventura Counties)

Tumor Site	#1 Health System Market Share Leader	#2 Health System Market Share Leader	#3 Health System Market Share Leader
Breast	9% (Non-NCICC)	8% (Non-NCICC)	6% (Non-NCICC)
Colorectal	13% (Non-NCICC)	6% (Non-NCICC)	5% (Non-NCICC)
Thoracic	9% (Non-NCICC)	6% (Non-NCICC)	6% (Non-NCICC)
Prostate	19% (NCICC)	8% (NCICC)	7% (Non-NCICC)

GI (non-colorectal)	10% (Non-NCICC)	6% (Non-NCICC)	5% (NCICC)
GU (non-prostate)	12% (NCICC)	12% (Non-NCICC)	6% (Non-NCICC)
Blood (malignant hem)	12% (NCICC)	8% (Non-NCICC)	7% (Non-NCICC)
Other Rare & Complex	9% (Non-NCICC)	9% (Non-NCICC)	6% (NCICC)
Total	10% (Non-NCICC)	7% (Non-NCICC)	5% (NCICC)

Source: 2014 California State Hospital Discharge Data

Table 4: New York State (excludes NYC)

Tumor Site	#1 Health System Market Share Leader	#2 Health System Market Share Leader	#3 Health System Market Share Leader
Breast	18% (Non-NCICC)	12% (Non-NCICC)	11% (Non-NCICC)
Colorectal	9% (Non-NCICC)	9% (Non-NCICC)	7% (Non-NCICC)
Thoracic	9% (Non-NCICC)	9% (NCICC)	8% (Non-NCICC)
Prostate	21% (Non-NCICC)	12% (Non-NCICC)	8% (Non-NCICC)
GI (non-colorectal)	11% (Non-NCICC)	10% (Non-NCICC)	7% (NCICC)
GU (non-prostate)	12% (Non-NCICC)	9% (Non-NCICC)	8% (Non-NCICC)
Blood (malignant hem)	14% (Non-NCICC)	14% (NCICC)	7% (Non-NCICC)
Other Rare & Complex	13% (Non-NCICC)	10% (NCICC)	9% (Non-NCICC)
Total	12% (Non-NCICC)	8% (NCICC)	8% (Non-NCICC)

Source: 2016 New York State Hospital Discharge Data

Tables 5: Greater St. Louis

Includes Crawford, Franklin, Jefferson, Lincoln, Madison, Monroe, St. Charles, St. Clair, St. Louis City, St. Louis, St. Francois, Warren, Washington Counties

Tumor Site	#1 Health System Market Share Leader	#2 Health System Market Share Leader	#3 Health System Market Share Leader
Breast	45% (NCICC)	20% (Non-NCICC)	16% (Non-NCICC)
Colorectal	39% (NCICC)	19% (Non-NCICC)	15% (Non-NCICC)
Thoracic	51% (NCICC)	15% (Non-NCICC)	13% (Non-NCICC)
Prostate	43% (NCICC)	23% (Non-NCICC)	18% (Non-NCICC)
GI (non-colorectal)	54% (NCICC)	18% (Non-NCICC)	10% (Non-NCICC)
GU (non-prostate)	48% (NCICC)	20% (Non-NCICC)	15% (Non-NCICC)
Blood (malignant hem)	50% (NCICC)	22% (Non-NCICC)	9% (Non-NCICC)
Other Rare & Complex	49% (NCICC)	18% (Non-NCICC)	18% (Non-NCICC)
Total	48% (NCICC)	17% (Non-NCICC)	16% (Non-NCICC)

Source: 2016 Missouri and Illinois State Hospital Discharge Data

These data points indicate that in all but two markets (Baltimore and St. Louis), the NCICCs were *not* the overall oncology market share leaders. Although NCICCs tend to have superior market positioning in the more esoteric, rare-and-complex cancer programs (e.g., blood cancers), many of the NCICCs lag the market share leader in commonly diagnosed cancers (e.g., breast, colorectal, prostate) which tend to drive program scale and market share.

Although the data from these five markets cannot necessarily be generalized to the entire US population, it is evident from this analysis that NCI-Designation does not guarantee superior scale or market positioning relative to competing cancer programs. NCICCs do tend to achieve a “Top 3” market share position in most markets; however, it is difficult to directly associate their market share position with designation status as opposed to other potential strategic factors (e.g., strength of their academic brand, payor and physician dynamics, existing referral patterns).

What can be ascertained from this analysis is that NCI-Designation has not historically been a requirement for achieving significant clinical scale and market share in oncology. Non-NCICCs in many regions across the country are effectively competing against NCICCs for oncology market share, indicating that there are external strategic forces in play more powerful than designation status driving market positioning. For cancer programs whose sole strategic objective is growth and scale-building, NCI-Designation is unlikely to be the most effective or financially viable mechanism for accomplishing these aims.

It is important to note that these findings represent *current* competitive realities. As discussed in the following section, the competitive dynamics in cancer care are evolving, and scale will increasingly depend on a program’s ability to position themselves as “high-impact” providers.

Variable 2: Impact

As illustrated in the previous section, the current competitive dynamics in oncology have created a playing field whereby a diversity of cancer providers – regardless of designation status – can compete effectively for market share with the right strategic investments. But the competitive landscape in oncology is shifting, and there is increasing recognition that “where you’re treated matters.” As patients increasingly seek performance ratings to guide their health care decisions, “high-impact” providers that outperform their competition in key areas will be better positioned to succeed.

Two of the most significant “impact” areas that will increasingly influence reputation and market share in cancer care are: a) clinical outcomes and b) research depth. In this section, we evaluate whether NCI-Designated providers are better positioned to compete in these two areas relative to other providers.

Clinical Outcomes

Although NCICCs received more than \$300 million in core support funding from the NCI in 2017,⁴ whether these resources have translated into better outcomes for cancer patients has not been tested empirically until recently. As the importance of outcomes measurement in cancer care has proliferated, so too has the volume of research comparing outcomes across provider types – much of which is now at the fingertips of patients.

If you Google “Best Cancer Programs”, the first link to show up is the *US News & World Report* rankings of the best cancer hospitals in the United States. Each year the *USNWR* publishes these rankings using

4. <https://www.cancer.gov/about-nci/budget/fact-book/extramural-programs/cancer-centers>

four measures to provide a total score: survival (37.5%); other quality-related indicators, including nursing (30%); patient safety (5%); and reputation with specialists (27.5%).⁵

In 2017, 47 of the US News Top 50 Adult Cancer Hospitals were NCI-Designated. Although the US News rankings are far from perfect (many have criticized the relative importance of “reputation with specialists” as having more to do with pomp and circumstance than patient care), NCICCs are clearly receiving enhanced recognition by a fairly influential source for their superior impact on patient care.

Other recent empirical studies have also shown that patients treated at NCICCs experienced superior outcomes compared with those treated at non-NCI-Designated facilities. A few of these studies are highlighted below:

1. In a 2015 study published in *Cancer* (Wolfson et al. / Impact of Care at Comprehensive Cancer Centers on Outcome: Results from a Population-Based Study), the authors found that among individuals aged 22 to 65 years residing in Los Angeles County with newly diagnosed adult-onset cancer, those who were treated at NCICCs experienced superior survival compared with those treated at non-NCICCs. The study focused on nearly 103,000 children (aged 1–14 years), adolescents and young adults (15–39 years of age), and adults (40–65 years of age) diagnosed between 1998 and 2008 in Los Angeles County (LAC) and reported to the LAC Cancer Registry.

5. <https://health.usnews.com/best-hospitals/rankings/cancer>

Table 1. Survival at NCICCC Versus Non-NCICCC Facilities					
Primary Diagnosis	5-Year OS ^a		Likelihood of Mortality ^a		
	OS (95% CI)	P Value	HR (95% CI)	P Value	
Full cohort	NCICCC	64.3% (62.7%–65.8)	<.001	1.0	<.001
	Non-NCICCC	60.7% (60.3%–61.1%)		1.3 (1.2–1.3)	
Hepatobiliary	NCICCC	33.8% (29.5%–38.0%)	<.001	1.0	<.001
	Non-NCICCC	18.7% (17.3%–20.2%)		1.5 (1.3–1.7)	
Lung	NCICCC	27.7% (23.3%–32.1%)	<.001	1.0	<.001
	Non-NCICCC	16.5% (15.7%–17.3%)		1.4 (1.3–1.6)	
Pancreas	NCICCC	12.5% (7.8%–17.3%)	<.001	1.0	<.001
	Non-NCICCC	6.2% (5.0%–7.4%)		1.5 (1.3–1.7)	
Gastric	NCICCC	30.7% (22.0%–39.4%)	.007	1.0	.01
	Non-NCICCC	22.2% (20.4%–24.0%)		1.3 (1.1–1.7)	
Breast ^{b,c}	NCICCC	88.6% (87.0%–90.1%)	<.001	1.0	<.001
	Non-NCICCC	85.9% (85.5%–86.3%)		1.3 (1.1–1.5)	
Cervical ^d	NCICCC	76.9% (69.3%–84.4%)	.27	1.0	.14
	Non-NCICCC	73.3% (71.7%–74.9%)		1.3 (0.9–1.9)	
Oral	NCICCC	68.5% (62.3%–74.7%)	.009	1.0	.09
	Non-NCICCC	58.8% (56.2%–61.4%)		1.2 (1.0–1.5)	
Colorectal	NCICCC	62.8% (58.1%–67.5%)	.31	1.0	.05
	Non-NCICCC	62.6% (61.6%–63.5%)		1.2 (1.0–1.4)	

Bold values indicate statistically significant findings.

Abbreviations: HR, hazard ratio; NCICCC, National Cancer Institute–Designated Comprehensive Cancer Center; OS, overall survival.

^aMultivariable Cox regression analysis adjusted for age, sex, stage of disease, race/ethnicity, socioeconomic status, and payer. For full cohort, the model also adjusted for diagnosis.

^bAdjusted for histology.

^cAmong women.

From Wolfson JA, Sun CL, Wyatt L, et al. Impact of care at comprehensive cancer centers on outcome: results from a population-based study. *Cancer* 2015;121:3885–3893; with permission.

- In a 2017 study published in *Journal of Clinical Oncology* (Ghaffary et al. / Impact of Proximity to NCI- and NCCN-Designated Cancer Centers on Outcomes for Patients with Prostate Cancer Undergoing Radical Prostatectomy), the authors found that Patients who undergo radical prostatectomy with access to an NCICCC experienced improved overall survival with no significant difference in utilization of secondary therapies. A total of 12,478 total patients diagnosed with clinical stage T1 or T2 prostate cancer between 2004–2011 using linked Surveillance, Epidemiology, and End Results (SEER)-Medicare data were included.
- In a 2009 study published in *Medical Care and Research Review* (Onega et al. / Influence of NCI Cancer Center Attendance on Mortality), the authors examined the influence of NCI designation on the likelihood of mortality at 1 and 3 years in Medicare beneficiaries with breast, lung, colorectal, or prostate cancer. Among patients who were treated at an NCICCs, they found a significant reduction in cancer-specific 1-and-3-year mortality relative to patients who did not receive care at an NCICCC. The mortality risk reduction associated with care at NCICCs was most apparent in late-stage cancers and was evident across all levels of comorbidities.
- In a 2005 study published in *Cancer* (Birkmeyer et al / Do cancer centers designated by the National Cancer Institute have better surgical outcomes?), the authors found that NCICCs had

lower surgical mortality rates with some high-risk cancer procedures than other comparable high-volume hospitals. In contrast, differences in long-term survival rates between NCICCs and control hospitals were considerably smaller. The study was based on data from the Medicare Provider Analysis and Review (MEDPAR) and the denominator files from the Centers for Medicare and Medicaid Services for the period 1994–1999. Six cancer procedures were chosen because of their relative complexity and high surgical mortality rates (cystectomy, colectomy, pulmonary resection, pancreatic resection, gastrectomy, and esophagectomy).

There are several theories for the measured differences in survival rates among NCICCs and non-NCICCs. For example, previous studies have found improved survival for cancer patients in high-volume hospitals (J. D. Birkmeyer et al., 1999; J. D. Birkmeyer et al., 2002; Finlayson et al., 2003; Hillner, Smith, & Desch, 2000; Hodgson et al., 2003; Schrag et al., 2003). In part, because of the larger volumes, NCICCs usually create multidisciplinary teams of physicians that are dedicated to a single type of cancer and are therefore highly-specialized.

Another theory is that treatment at institutions with higher clinical trial accrual and access to the latest research protocols is associated with longer overall survival (Eaton BR, et al., 2016). NCICCs are given the task of generating new knowledge through research and they are often first to offer breakthrough research protocols that can potentially be more effective than standard therapies.

Other theories suggest that the survival benefit could also be related to better processes of care, such as timely receipt of surgery, greater compliance with guideline-based treatment, and multidisciplinary care teams.

Research Depth

For years, the foundations of cancer treatment were surgery, chemotherapy, and radiation therapy. But over the past several years, immunotherapy—personalized therapies that enlist and strengthen the power of a patient’s immune system to attack tumors—has emerged as a new “pillar” of cancer treatment. One particularly novel form of immunotherapy is called chimeric antigen receptor (CAR) T-cell therapy. In this approach, immune cells are removed from a patient, armed with new proteins that allow them to recognize cancer, and given back to the patient in large quantities.

Although CAR T-cell therapy is widely viewed as a promising new frontier in cancer care, access to these new therapies is restricted to a limited number of treatment centers across the country. For example, in 2017, two landmark CAR T-cell therapies received regulatory approval from the FDA. One of these therapies, called Yescarta, treats patients with non-Hodgkin’s lymphoma and was originally only offered at 16 authorized treatment sites nationwide (this number is now up 30+ treatment sites).⁶ All 16 of these original sites were NCICCs that participated in research leading to the development and approval of CAR T-cell therapy.

As cancer care becomes increasingly personalized and precise, so too will the complexity of new therapies. As seen with CAR T, many of these new therapies can only be offered at highly specialized

6. <https://www.yescarta.com/authorized-treatment-centers/>

cancer centers that are capable of safely and effectively translating these therapies between the laboratory and clinic. Many new therapies will require not only a high degree of clinical sub-specialization, but also an advanced research foundation and ability to facilitate the transition of scientific findings through the translational continuum.

In this new age of cancer care, patients seeking access to the latest and most innovative cancer research protocols and newly approved therapies are increasingly likely to be steered toward an NCICC. But how exactly does NCI-Designation enable providers to be at the vanguard of cancer research and therapy?

1. It enables more impactful science. The process of NCI-Designation mandates formation of interactive research programs, requiring collaboration among researchers from broad backgrounds. Such programs facilitate larger grants (P01s, SPORes, etc.) and the infrastructure that is created around NCI-Designation inherently accelerates these applications. Financially, these grants substantially increase the indirect cost recovery of research for the medical center, making the research mission more profitable and further encouraging investment in innovation.
2. NCI-Designation encourages rapid translation of science to patients. A major focus of NCI-Designation is encouraging novel investigator-initiated clinical trials, meaning NCICCs are typically the first to translate groundbreaking discoveries into the clinical setting at their own institution. As a result, NCICCs are equipped to offer access to the most advanced and promising treatments to patients sooner than non-NCICCs because of their breadth and depth in investigator-initiated trials.
3. NCICCs have an enhanced ability to recruit cancer research superstars. Leading cancer investigators expect NCI-Designation to maximize their influence and chances of success. Research proposals from investigators at NCICCs account for over three-quarters of the successful investigator-initiated grants that are awarded by the NCI. Likewise, more than three-quarters of all NCI extramural funding to healthcare provider institutions goes to NCICCs, making the research mission at NCICCs more profitable, and in turn enhancing the NCICC's ability to attract superstar researchers (<https://fundedresearch.cancer.gov/nciportfolio/search/SearchForm;jsessionid=263415A5AE94FD78CF20AC114D44A50A>). In addition, the Cancer Center Support Grant (CCSG) itself offers the core support, infrastructure and shared research resources not typically seen in Non-NCICC environments. These things enable cancer researchers to more easily focus on the things that matter most – science and discovery.
4. NCI-Designation enables access to certain supplemental grants only accessible to NCICCs. The NCI frequently releases Request for Proposals (RFPs) restricted to NCICCs, and multiple funding opportunities may be awarded through these mechanisms each year. Non-NCICCs are excluded from having a seat at the table for these funding opportunities, which often exceed one million dollars annually in direct costs, even if they happen to be a national leader in the specific area the NCI supplement is targeting.

Conclusion

This article attempted to evaluate the strategic value associated with NCI-Designation by analyzing the role that it plays in influencing two key strategic variables – clinical scale and impact.

From a health system perspective, the strategic value of NCI-Designation is contextual. For health systems whose primary strategic objective is maximizing cancer program scale, market share and financial strength, NCI-Designation has not historically been a requirement nor a practical investment to achieve these aims (for an average academic cancer program that yields \$25,000 in contribution margin per new cancer patient, an investment of \$50 million+ in the pursuit NCI designation would require growing the program by at least 2,000 new cancer cases for the investment to pay for itself). Alternatively, for health systems aiming to maximize their impact – in terms of research depth and ability to influence clinical outcomes – NCI-Designation is clearly a strategic enabler.

As the competitive dynamics of cancer care continue to evolve, however, so too will the strategic value of NCI-Designation. While cancer program scale (Variable 1) hasn't historically been dependent on impact (Variable 2), the two variables are becoming increasingly co-dependent as the rising demand for state-of-the-art cancer care and research can only be met by NCICCs. As a result, strategic value of NCI-Designation will continue to appreciate in the years to come.