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DEVELOPING
an Oncology IT Strategy

Cancer has become a disease characterized by its data. Insurance companies demand cost and utilization data, searching for a meaningful way to optimize value. Patients request test results, lab values, and physician notes, seeking to become shared decision-makers in their care. Researchers, pharmaceutical manufacturers, and others seek clinical data in an effort to further our biological understanding of the disease and provide clinicians with novel treatment compounds and decision support. Everyone wants cancer data, and yet the demand for quality oncology data far outstrips the provider community's ability to collect and deliver such data.

This data deficiency is driven, in part, by healthcare organizations' pattern of adopting one-size-fits-all approaches to information technology (IT), expecting generic ambulatory systems to support the complex specialty that is oncology. The resulting landscape has been one of physician frustration, poor EHR (electronic health record) utilization, error-prone workflows in chemotherapy orders and administration, disengaged patients, and ultimately, a lack of quality cancer data. However, some healthcare organizations have taken the opposite approach, recognizing that superior outcomes, improved patient experience, and value-based readiness in oncology can only be achieved through a measured, tailored approach to information technology.

Oncology's multimodal, multidisciplinary nature makes it a healthcare specialty with a tremendous amount to gain from a fully coordinated, data-sharing IT ecosystem.

This article reviews the keys to developing a successful oncology-specific IT strategy in a continuously changing IT environment. Included is a description of the process that successful healthcare organizations have followed and the pitfalls and best practices uncovered along the way, offering a path forward for those who would follow their example.

Leadership & Project Support
The prerequisite for any successful oncology IT strategy is enlightened leadership. Oncology is a highly complex specialty and is not well served by many standard healthcare information systems. Leadership understands that a combination of high-toxicity biologicals, complex treatment plans and infusion regimens,
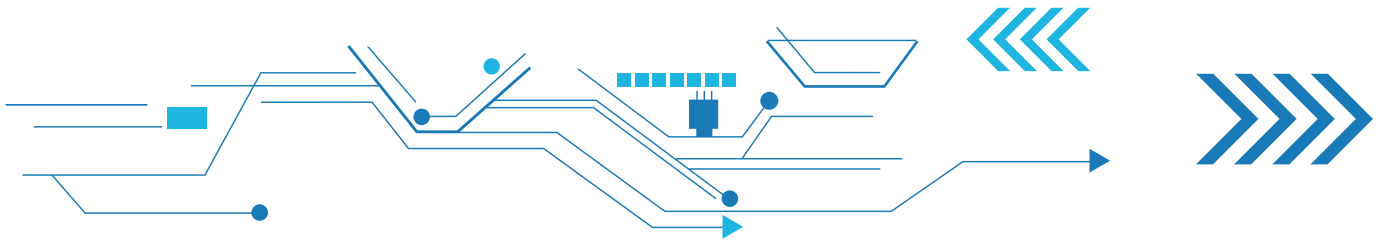
varying dose schedules, lifetime radiation dosages, and clinical trials often make oncology resistant to the efficiencies and improvements typically gained in large-scale technology deployments. Conversely, oncology's multimodal, multidisciplinary nature makes it a healthcare specialty with a tremendous amount to gain from a fully coordinated, data-sharing IT ecosystem.

With this understanding, enlightened leaders should begin IT strategy exploration by engaging a team with a robust oncology perspective, including representation from medical, surgical, and radiation oncologists and allied health professionals. This team is charged with assessing the gaps in the current environment and identifying a set of solutions that can deliver an exceptional oncology experience, integrated with the enterprise's broader delivery network.

Enlightened leadership also recognizes and guards against the temptation to jump directly to solutions. The process of developing a robust IT strategy in oncology requires a deliberate approach (Figure 1, below), which often includes a months-long process of strategic discovery, market evaluation, and eventual vendor solicitation and evaluation. While this timeline may seem like a luxury, the guiding principle should be to preserve a process that allows sufficient time for proper analysis of current and future oncology environments prior to shopping for solutions.
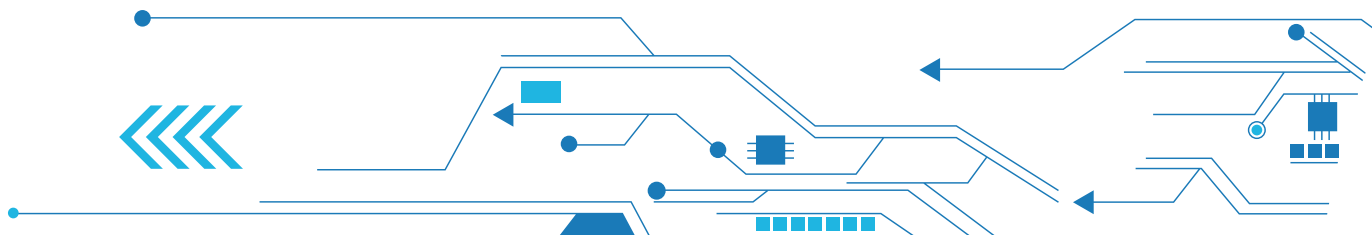
Phase I. Discovery

An oncology IT strategy should begin with an understanding—at an expert level—of how technology influences clinical decisions and the workflow of all stakeholders in the cancer value chain. This will change within each environment, as unique workflow concerns, systems limitations, and physician preferences make the knowledge highly specific. For that reason, discovery is the first phase of oncology IT strategy development. This can be segmented into the following steps.

Engaging Stakeholders. The primary key to success—fully engaged stakeholders—is to enlist an engaged Steering Committee. Composed of physicians, allied professionals, and revenue cycle

Figure 1. Sample IT Project Timeline

Q2 2016 PHASE I	PHASE II	PHASE III	Q2 2017
Formation of Oncology IT Steering Committee	Formal IT requirements for oncology solution set(s)	Preparation and distribution of RFP(s) to target vendors	
Inventory of all IT systems deployed in oncology environments	Workshop to refine requirements and target vendors	Onsite vendor demonstrations and use-case scenarios	
Workflow mapping with key oncology constituents	Market scan of oncology-specific IT solutions	Site visits to deployed environments for final evaluation	
Interviews with oncology constituents	Matrix of vendors and solutions with high-level workflow and IT deployment considerations	Selection and negotiation of solution(s)	
Development of synthesized oncology gap analysis	Evaluate solution sets with Oncology IT Committee		
Determination of future-state oncology business architecture			

and IT leadership, the committee should be right-sized to the organization. Likely members include medical oncology, infusion, radiation oncology, pharmacy, pathology, radiology, surgery, inpatient nursing, billing, and IT. The Steering Committee should meet monthly, at a minimum, and review the timeline and deliverables associated with each phase of the IT strategy.

Defining a Common Vocabulary. Discovery is best facilitated with the Steering Committee and other key stakeholders speaking the same language. For this reason achieving early buy-in on a common vocabulary for clinical workflow and IT concepts is critical. Often dissonance in conversations around oncology IT is caused by confusion in terminology. Which care environments are covered under "oncology?" What is an "IT system" and what does it affect or enable? How does the "technology architecture" support the requirements of the "business architecture," including clinical and administrative workflow?

Ecosystem and Workflow. The next step is to thoroughly understand the existing cancer care environment(s). This involves documenting "current state" clinical and operational workflows and noting all key touch points with information technology—both hardware and software. Typically this discovery process will uncover a host of complaints and process breakdowns that will need to be remedied, which should be documented as part of the exercise. The detailed review of systems and workflow allows the Steering Committee to capture the nuances of each care environment and begin the process of designing a more optimal solution for workflow and information capture requirements.

Creation of an Oncology IT Gap Analysis. The aggregation of current state information typically produces a litany of process breakdowns, wish-list items, and needs being underserved by existing system capabilities. In addition to current-state information, the Steering Committee must extrapolate beyond what was heard in the interviews and consider the current system's ability to handle challenges on the horizon. What likely future challenges may arise as further digitization, data-intensive workflows, cost

Table 1. Gap Analysis Categories	
DATA INTEGRATION	In many healthcare systems a "best of breed" IT strategy requires a significant amount of work to create data connectivity. Gaps tend to revolve around lack of clinically relevant information available at the point of care, as well as deficiencies in data governance, or physicians calling the same data different names across multiple systems.
PATIENT & PHYSICIAN EXPERIENCE	Gaps are typically perceived between the current care process and what the team envisions as a personalized, intuitive approach to care that leverages modern technology so that patients and families can be engaged in the care process, rather than passive bystanders. Care experience gaps are often bundled into categories like way-finding, efficiency, patient engagement, access, safety, and personalization.
ONCOLOGY FUNCTIONALITY	Perceived gaps in workflow often relate to functional limitations of the software in place, or lack of education on existing software capabilities. For medical oncologists, this feedback often involves pain points in the EHR (e.g., redundant data entry, multiple clicks, buried screens, and disparate abilities).
DATA CAPTURE & REPORTING	Many healthcare organizations are increasingly interested in tracking and reporting on outcomes, cost of care, adherence to clinical pathways, operational efficiencies, and other metrics related to accreditations and marketing efforts for centers of excellence in oncology. The ability to aggregate and dissect this data is usually a major gap, and requires an IT strategy that emphasizes oncology-specific analytics.
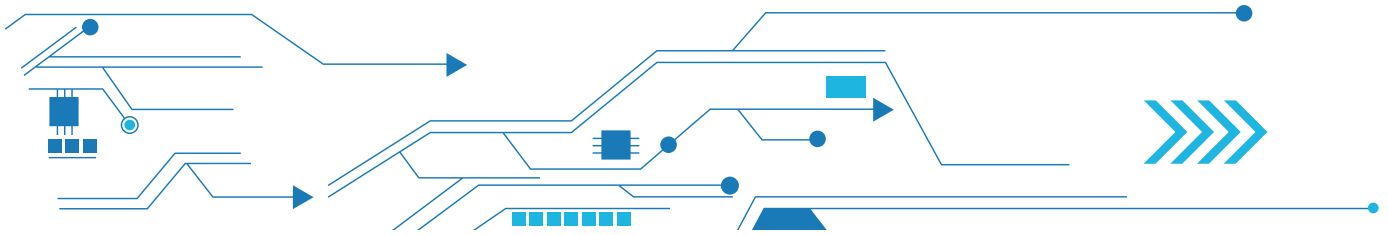
pressures, or government mandates emerge? Ideally the gap analysis is proactive in anticipating emerging trends, and not just reactive to current-state deficiencies. At a high level, gaps can be categorized along the continuum highlighted in Table 1, page 49.

The most critical component of Phase II is ensuring that the EHR is specific to oncology—both in form and function. The oncology EHR is the central nervous system of the cancer center and drives the flexibility or inflexibility of system architecture and downstream workflow.

Defining Future State Workflow and Business Architecture.
The end goal for discovery is to develop a "future state" architecture that will enable the cancer program to operate efficiently and safely and support positive patient outcomes. Many organizations fail at this, allowing their existing IT architecture to drive the processes in their cancer center, rather than designing the optimal cancer program and then searching for solutions that support their vision. Beware of this trap in the process and use the gap analysis to design optimal workflow and business processes before moving forward. Successful business architectures:

- Tell the story of the cancer program, including its mission, resources, and future aspirations
- Focus the Steering Committee and key stakeholders on important IT needs
- Drive vendor requirements
- Maintain focus on an oncology IT strategy that is uniquely tailored and uncompromising in its vision.

Phase II. Market Scan
This phase involves a process of developing requirements and soliciting vendors. Healthcare organizations commonly have trouble staying true to the vision within the constraints of market solutions, as well as managing the project timeline. To stay on track, the Steering Committee must translate the future state workflow and business needs into a set of functional requirements, i.e., a comprehensive list of your program's wants and needs. The

gaps in the architecture may drive a focus on functionality provided by an oncology-specific EHR, patient navigation software, data analytics, or a cancer patient portal. It may also focus on "next-gen" capabilities that rely on unstructured data capture, natural language processing, real-time decision support, or risk stratification. Whatever the need, the Steering Committee should scan the market for all available solutions, looking at both "best fit" and "best of breed" solutions, and evaluate them at a high level for harmony with the future state architecture and the health system's interoperability and performance standards.

Navigating the landscape of oncology IT software can be complex, but broadly consider if the vendor(s):
- Offer specific functionality that meets the needs of the future state architecture
- Meet requirements of accreditations and Meaningful Use
- Rank highly in industry reports, e.g., Black Book, KLAS, Truven
- Support workflow and deployment efforts consistent with organizational needs
- Fit within the broader hospital and/or healthcare system's IT strategy
- Have a proven base of customers that can serve as references in the evaluation stage.

The most critical component of Phase II is ensuring that the EHR is specific to oncology—both in form and function. The oncology EHR is the central nervous system of the cancer center and drives the flexibility or inflexibility of system architecture and downstream workflow. The EHR landscape is filled with software platforms that market a specialized ambulatory approach and, in actuality, have varying degrees of oncology-specificity, interoperability, and clinical effectiveness. Identifying an appropriate solution requires a broad cancer perspective on the requirements that can be met within the crowded solution set. Those vendors that meet the requirements should be short-listed and included in the request for proposal (RFP) invitation.

Phase III. System Selection
The final phase of the IT strategy involves system evaluation and selection. During this phase, the Steering Committee and clinical users, e.g., physicians, oncology nurses, radiation therapists, should drive the evaluation as to whether the solution set meets the needs and vision expressed in the future state architecture.

Phase III begins with issuing an RFP. The RFP should elicit an honest self-assessment from vendors about their ability to meet the functional requirements and their commitments to customer service, implementation support, and product upgrades.
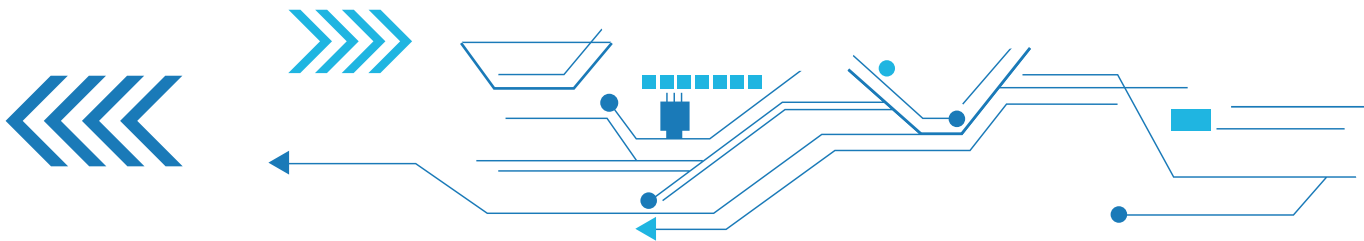
While these items may be dictated by service agreements, it is useful to understand the companies' philosophies and gauge their desire to grow with the cancer program, anticipate future program needs, and offer products that adapt to cancer industry trends.

After reviewing the RFPs, conduct remote and onsite demonstrations to test the validity of the vendors' self-assessments and to observe functionality first hand. The demo process is the most cumbersome portion of the IT strategy engagement, but also the most indispensable in terms of ensuring that system selection aligns with the cancer program's long-term vision. It is critical to prep the vendor with specific use-case scenarios that mimic real-life clinical oncology situations to discourage vendors from showcasing only their strongest features.

The final step in the evaluation process involves short-listing the vendors of interest and organizing site visits to environments where the solution(s) are deployed. At this point, the steering committee should be armed with all available knowledge and be prepared to make a purchase decision. The final system selection will often be driven by clinical champions, but in some cases may be facilitated by a selection algorithm that weighs various organizational priorities. Figure 2, below, shows an example of such an algorithm.

With vendors selected, the purchasing department can now take the reins and begin the process of negotiating the scope of work, service level agreements, and pricing with the vendor.

Wrap-Up

Some cancer programs around the country have successfully designed IT systems that align with best-practice patient experience and clinical outcomes. For many other cancer programs, IT remains a roadblock, rather than a facilitator. A key distinction between these two scenarios is the development of a vision, the recruitment of a committed group of stakeholders, and the perseverance to truly define and adhere to an IT roadmap for the organization. Oncology will continue to be defined by its data, and technology will continue to be a moving target, but healthcare systems equipped with robust IT strategies will be nimble, proactive, and far more effective in providing exceptional care to their patients. **OI**

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Figure 2. IT Vendor Selection Algorithm

VENDOR SCORE = Corporate Culture Score (weighted at 15%) + Functionality (weighted at 25%) + Business Risk (weighted at 25%) + Price (weighted at 20%) + $\dfrac{\text{Customer Base}}{\text{Number of Users (weighted at 15%)}}$

Note: Weighting will vary depending on institutional procurement requirements, but using an algorithm can drive some impartiality in that selection process