

WHAT IS ENTERPRISE IMAGING, REALLY?

Exploring the benefits of an integrated EI strategy and its role in value-based care delivery



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INTRODUCTION

Enterprise Imaging (EI) plays an important role in the shift toward value-based care and is the next logical investment for many following the Electronic Health Record (EHR). But what does EI mean, exactly? What benefits does it provide, and how can an organization successfully integrate EI into their EHR vision and strategy?

This white paper explores the answers to these questions and provides tips and tools for healthcare leadership ready to start their Enterprise Imaging journey and complete the EHR promise of value-based efficiencies.

WHAT DOES ENTERPRISE IMAGING *REALLY* MEAN?

Simply put, true EI is a comprehensive solution that can manage all imaging across the entire care enterprise. It is intended to address not only Radiology and Cardiology, but also the 60+ departments and service lines that generate various forms of imaging using their own unique workflows and devices. A well-designed Enterprise Imaging program leverages technology to deliver the longitudinal imaging record at both clinical (e.g. EHR) and diagnostic levels. It not only includes traditional PACS, CVIS, and VNA functionality, but also the tools required to facilitate enterprise-wide image exchange and collaboration such as Enterprise Viewers, Encounters-based Workflows, Image Exchange platforms, and more. Ideally, an EI platform should provide the flexibility for organizations to progressively implement and expand into new clinical workflows as priorities and resources permit. This is in contrast to the recently popularized deconstructed approach, where healthcare organizations procure applications from disparate vendors to form a custom EI solution. In the former model, much like with the EHR, organizations can realize the platform benefits of reduced complexity, inherent interoperability, and seamless workflows. With the latter, while it affords organizations the



While there is a certain segment of the market that prefers the best-of-breed approach [...] the preferences of the majority of organizations reveal a steady march towards single-source.

- Reaction Data, "Ideal Approach to Radiology IT: Best-of-Breed vs. Single-Source"

ability to opt for ‘best of breed’ applications, deconstructed applications typically increase complexity, shifting the burden of integration to the healthcare organization, and often require separate procurement projects to expand clinical functionality.

The shift toward value-based care has spurred significant investment in EHR technologies across US healthcare organizations, reaching more than \$14B in 2019 alone. These investments are intended to improve data aggregation and access across clinical specialties and providers, enable patient-provider collaboration, better manage supply chain and revenue cycle management, and deliver greater insights into organizational performance and population health trends. But in most cases the unique needs of the varied imaging service lines weren't considered.

Diagnostic imaging plays an essential role in diagnosis and treatment of many clinical conditions –

from minor injuries to chronic life-threatening diseases – and the EHR strategy cannot be considered complete until the need for cross-specialty image management, viewing, and sharing is considered.

It is necessary to take a step back and re-assess the definition of Enterprise Imaging, going back to its original intention of providing increased value – from clinical, operational, and financial perspectives. Enterprise Imaging should not be viewed as a storage solution alone (aka VNA), but rather as a comprehensive, singular strategy and platform for unifying imaging specialties by creating seamless workflows – from order to results delivery – improving real-time collaboration between onsite and offsite care providers, and reducing technical and operational complexities to ultimately complement the EHR by delivering a complete, integrated, actionable, and longitudinal view of the patient's imaging record.

Enterprise Imaging is NOT...



NOT an IT Only Initiative

An EI strategy requires collaboration across all facets of the organization including organizational and departmental leadership and clinical, administrative, operational, and IT stakeholders.



NOT just VNA Storage Consolidation

The value of VNA consolidation pales in comparison to the efficiencies gained when workflows and infrastructure converge across service lines, departments, and facilities.



CANNOT Be Easily Deconstructed

Best-of-breed sounds appealing but adds complexity and can quickly lead to interoperability and maintenance challenges for organizations who are short on IT, integration, and support resources.

BENEFITS OF A TRUE ENTERPRISE APPROACH

A strategically focused and well-executed Enterprise Imaging strategy can deliver benefits far beyond simple storage consolidation. At its core, EI focuses on converging not only images and data across service lines and specialties – but also clinical workflows, business and IT resources, financial optimizations, and clinical and business intelligence.

Clinical Workflow Benefits

In a fragmented ecosystem, care is organized around clinical modalities, specialties, and departments – not the patient. It has been well documented that without an enterprise approach, care providers are forced to look across multiple systems to find information that's relevant to diagnosis and treatment decisions, and image-based collaboration across clinical specialties is often cumbersome and inefficient.

A true EI platform should harmonize workflows enterprise-wide to create a patient-centric approach to care delivery that facilitates information sharing, fosters multi-disciplinary collaboration and patient engagement, and delivers measurable improvements in both staff and patient experiences.

By providing a longitudinal view of patients' full multispecialty imaging timeline and journey, EI can drive clinical workflow consistency and efficiencies at-scale that eliminate redundancies, reduce manual workflows, improve productivity, and greatly enhance communication and collaboration across imaging specialties. This is accomplished through:

- Contextually intelligent integrations with the EHR that deliver relevant and actionable insights to the point-of-care when and where they're needed.

30%

of malpractice complaints in the US are related to a communication failure.
- AJMC

- A comprehensive collection of diagnostic tools to support the unique needs and challenges of each clinical specialty (e.g. radiology, invasive and non-invasive cardiology, ophthalmology, clinical photography, dermatology, surgery, pathology, and others).
- Flexible workflows that accommodate the unique needs and preferences of each clinical service line and stakeholder.
- Integration of Artificial Intelligence (AI) and Machine Learning (ML) to intelligently analyze the vast amount of information generated across the enterprise to bring forward relevant and actionable insights at the point-of-care.

Benefits of the platform approach extend beyond the hospital as well. By image-enabling the EHR and providing tools like diagnostic quality enterprise viewers, mobile or web-based portals, and digital communications to the referring community, EI can facilitate closed-loop communications, improve the provider experience, and drive referrer loyalty. Programs like Epic's Community Connect with EI provide a framework for fostering hospital-referrer communication, and provide financial benefits. As imaging is an essential part of diagnosis and treatment planning, so too is imaging data an essential part of a complete Community Connect program.

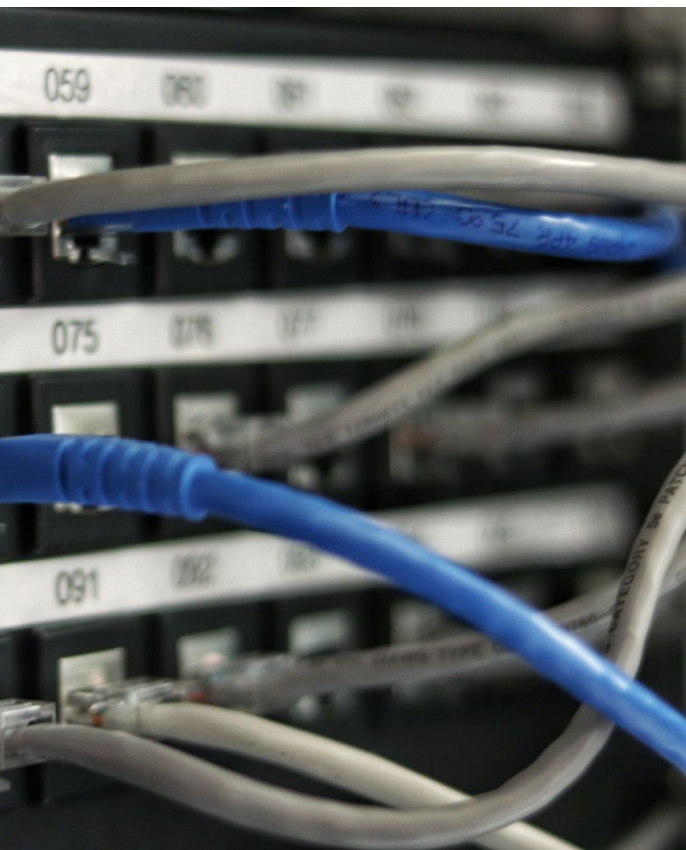
Business and IT Benefits

When systems are not seamlessly integrated across the enterprise, unnecessary complexity is created. This can inhibit the achievement of healthcare organizations' business and IT objectives. Separate storage platforms, disparate infrastructure, conflicting interfacing protocols and requirements, and differing service and support models all result in costly infrastructure, fragile integrations, and often require teams of dedicated resources to keep the multiple systems running.

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By converging image collection, storage, management, and sharing into a highly scalable and centralized platform, EI can significantly reduce technical complexity and cost. As well, flexible deployment models such as virtualized or cloud-hosted alternatives can further simplify IT infrastructure and administration, while adding additional layers of redundancy that can improve reliability and performance system-wide. By providing a scalable and flexible platform that supports the latest industry standards (HL7, FHIR, XDS/XDS-I, DICOM/DICOMweb, etc.) or advanced integrations (APIs, etc.), EI enables ease of integration with current and future applications. This helps to ensure the unique needs of physicians, staff, and patients will always be met – as quickly and simply as possible.



Financial:

System-wide inefficiencies, overutilization or duplication of imaging services, missed reimbursements, and medicolegal risk exposure are all challenges that negatively impact a healthcare organization's progress toward value-based care delivery and financial performance.

Because EI converges imaging workflow and infrastructure across the enterprise, it has the potential to deliver significant financial advantages compared to the traditional departmental approach.

EI can reduce imaging total cost of ownership (TCO) by:

- Consolidating and reducing infrastructure requirements.
- Optimizing storage utilization by implementing lifecycle management (LCM) policies and leveraging lower-cost storage alternatives like tiered or cloud models.
- Simplifying integrations and reducing the cost and time associated with interface management
- Supporting encounter-based workflows to integrate point-of-care devices (e.g. POCUS) into standardized billing systems and workflows and reduce the impact of missed reimbursements.
- Standardizing POCUS capture, storage and quality expectations to derive long-term value of all

medical images and help reduce unnecessary imaging.

- Anticipating health service demand and optimizing resource planning to reduce costs associated with over or under staffing.
- Converging and streamlining IT and administrative tasks to reduce staffing and training costs.
- Unifying and facilitating hardening of enterprise-wide security and privacy controls to reduce the risk of costs associated with system breaches or HIPAA exposure.

One of the newest challenges that healthcare executives are facing is measuring the value associated with EI initiatives. There are several metrics that can be used to measure the tangible value of an EI investment according to business, clinical, and IT objectives.

Common metrics include but are not limited to:

- | | |
|---|--|
| • Capital infrastructure and storage costs | • Staff productivity and cost per case/encounter |
| • Number of systems to maintain; associated training required | • Hospital (re)admissions and length of stay |
| • Frequency/cost of data migrations | • Average discharge time |
| • Number of interfaces/routing to maintain | • Reimbursements per encounter |
| • Turnaround and wait times | • Repeat exam rates |
| | • Etc. |

While some of these are easily measured, others are more qualitative in nature, delivering 'soft' benefits such as time savings and frustration reductions that result from a consistent user experience for clinical staff and patients. These can also be measured by setting benchmarks (e.g. how satisfied are physicians

today?) and comparing these to future measurements (how has satisfaction improved as EI is rolled out?). Before and after implementation measurement of physician burnout also applies here.

Who Drives the Initiative?



Decision Makers:

- Executive leadership: CEO, CIO, CMIO

Influencers:

- Departmental leadership
- IT administration
- Key physicians & clinicians
- Finance
- Affiliates

HOW TO BUILD A SUCCESSFUL ENTERPRISE IMAGING STRATEGY

A coherent and unified platform for imaging data management should be the next strategic priority following the EHR. EI projects more closely resemble EHR projects than any historical imaging project due to its size, scope and affected population. Unlike the EHR, which is a forklift replacement of many systems, EI typically is tasked with integrating multiple legacy systems, knitting together previously silo'd, often home-grown, implementations. Thus, EI and EHR strategies need to work hand-in-hand and require similar governance, planning, execution, and change management design in order to be successfully implemented by the IT staff and adopted by clinicians.

Governance:

The first step in crafting an Enterprise Imaging strategy is establishing a governance team. This taskforce will set the strategic objectives and direction of the Enterprise Imaging roadmap, allocate budget and resources, and provide oversight of its implementation.

There is likely a wealth of knowledge within the governing team on what worked and what didn't during the EHR deployment. This can provide insight into successful roles, operations, and logistics of the EI implementation. There are several important qualities to consider and implement in building an effective governance team:



Organizations with an IT management and governance framework have 25% higher profits than organizations with poor IT governance, given the same strategic initiatives.

Building an Effective Governance Team:



1. Executive Sponsorship

First and foremost, an effective governance team should be stewarded by an executive sponsor who understands the value of, and has a vision for, a unified imaging enterprise, and is committed to seeing the program through – from inception through adoption.



2. Broad Representation

The governance team should be representative of the key stakeholder groups and functions across the enterprise, including broad clinical representation as well as functional roles from financial, managerial, operational, and IT groups. This ensures that interdependencies are considered and balanced, and engagement and buy-in are established early. The team is tasked with designing an EI roadmap with the big picture in mind – considering the use cases and priorities of all imaging service lines, referring physicians, and patients.



3. Empowered Decision Making

Decisions made by EI governance will impact budgets, care delivery models, and culture. To ensure follow-through and accountability, the governance team must be empowered and visibly supported from the top in order to provide the project with the status required to overcome the inevitable obstacles.



4. Clarity of Objectives

The governing team will drive the initiative's success by establishing and publishing clear objectives. We have discussed many of the beneficial results of the Enterprise Imaging implementation above. Typically, objectives will address strategic directives such as: enable cross-department/cross-geography collaboration, accelerate diagnosis and treatment, streamline workflows, more effectively measure care quality, as well as reduce cost.



Planning:

The EI roadmap should be designed with the big picture in mind. Immediate priorities must of course be identified and addressed first, with short- and long-term plans in place to incorporate additional imaging service lines and use cases according to priority, budget, and resources. What constitutes an immediate priority is dependent upon the current-state and objectives of each organization, but commonly include areas where IT resources are over-taxed and/or over-budget, clinical productivity metrics are suffering, financial reimbursements are missed, referrer loyalty is lagging, or there is significant provider or patient dissatisfaction.

Selecting the Right Partner:

Because the Enterprise Imaging journey is typically a multi-year initiative, the vendor selection is akin to a partner selection, not a short-term transaction.

As such, it is essential to identify a partner early in

the EI process. The right vendor can bring experience with differing healthcare organizations and EI models which can be leveraged to guide organizations and optimize resources and timelines. Experience can aid in proactively identifying and mitigating potential roadblocks and risks.



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Vendor selection should not only be based upon a platform's ability to address immediate problems and address short-term goals, but also upon how well their organizational culture, strategic vision, support structures, and product roadmap aligns with the organization's own. EI is

constantly evolving, with new workflows, features, and integrations emerging regularly. In order to harness the full value of an EI platform, find a vendor with a clearly defined roadmap and a proven commitment to be an engaged, long-term partner.

Change Management:

How well the organization is prepared for the changes that EI will bring directly correlates to the success of the EI initiative. This preparation does not happen overnight. An EI strategy typically consists of several “smaller” imaging projects, implemented over a number of years. As with EHR projects, this requires an intentional approach to change management that is designed to foster engagement early-on and drive adoption across the organization. Foundationally, this should include:

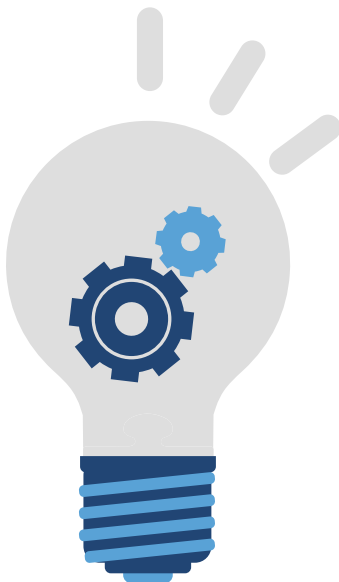
1. Evangelization of the purpose, problem statements, and benefits to be realized in order to gain buy-in – especially among change resisters.
2. Constant, clear communication to build and sustain momentum throughout the project. EI is not a ‘quick fix’ and requires dedication, accountability, and continuous collaboration in order to be successful and meet outcomes expectations.
3. Training that builds competencies and confidence in EI among different tiers of users is essential for providing a smooth roll-out and positive experience across the organization.



THE PATH TOWARD REALIZING THE TRUE VALUE OF ENTERPRISE IMAGING

Enterprise Imaging delivers so much more than storage consolidation or a VNA initiative. By putting a comprehensive EI platform in place that augments the EHR, healthcare organizations can support a value-based approach to deliver proactive, quality care for the populations they serve, while also driving efficiencies that increase scalability and lower costs system-wide.

So where to go from here? These six high-level tips are an excellent starting point for planning an Enterprise Imaging journey. Why wait? Take the first steps toward realizing greater value today:



TAKE THE FIRST STEPS TOWARD REALIZING GREATER VALUE TODAY

1. Start with establishing an EI governance team that includes executive sponsorship who can align the objectives, budget, and resources with organizational and EHR objectives.
2. Engage physicians and staff across specialties and departments to identify top priorities and build an EI roadmap that will deliver immediate and consistent value.
3. Establish a framework for measuring key performance indicators (KPIs) that align with the organization's clinical, technical, and business objectives and support the development, execution, and ongoing measurement of targeted improvement programs.
4. Look for an EI platform that supports a diverse array of imaging specialties (image types, volumes, diagnostic tools) and can deliver a highly scalable and performant platform that aligns with future growth objectives.
5. Ensure that image sharing and collaboration is a top-of-mind consideration to drive multi-disciplinary, patient-centric care across the care continuum.
6. Engage with an EI vendor who brings broad and diverse experience across imaging specialties and is committed to a collaborative approach to address enterprise-wide workflow, IT, and business needs.