From Enterprise Imaging to Healthcare Content Management: The Next Step in Health Data Interoperability

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Introduction

As the healthcare industry becomes more and more patient-centered and outcomes-based, patient information becomes more invaluable. It's not just gathering this data that is crucial, but ensuring it gets into the hands of the clinical stakeholders that need it to make decisions at the point in time they need it most.

The adoption of EHRs was born out of this need, and today, nearly all hospitals leverage the technology to capture and manage discrete patient data such as vitals, medication lists, allergies, lab results and other encounter-based information. However, providers quickly realized that the EHR doesn't fully encompass all the patient content needed to make informed diagnosis and treatment decisions.

For example, access to all types of patient medical images – both the DICOM-based images that are typically stored in PACS or RIS repositories and non-DICOM specialty images such as endoscopy video or dermatology photos stored in specialty systems – are often absent or inaccessible from the EHR. In response, many healthcare providers have embarked on Enterprise Imaging initiatives designed to identify all patient images that exist throughout a healthcare enterprise and centralize the management and viewing of these images using a variety of technologies – from a VNA (Vendor Neutral Archive) to enterprise viewing and image connectivity tools.

The benefits of Enterprise Imaging are powerful and far reaching. First and foremost, the strategy helps improve patient outcomes by making all medical images accessible from core clinical applications such as an EHR or PACS. Easy access to more complete patient information results in better, more accurate, diagnosis and treatment. Enterprise Imaging also helps streamline clinical and departmental workflows by eliminating the manual searches and multiple logins typically required to track down DICOM and non-DICOM images scattered throughout a healthcare facility. Centralized control and management of images also helps ensure data security while controlling costs. Security is optimized by facilitating the process of applying safeguards to imaging assets and costs are reduced through the elimination of redundant testing, increases in departmental productivity and fewer PACS migrations and system maintenance demands.

However, for all the advantages a successful Enterprise Imaging engagement provides, it still doesn't completely encompass all of the patient-related content missing from the EHR. For example, what about clinical documents, consent forms, referral letters and other unstructured content that exists outside the EHR in servers, email or even filing cabinets? This information can also be vital to providing clinicians with a complete picture of the patient.

Typically, this type of patient data is managed using any number of document management or ECM (enterprise content management) systems. However, managing your Enterprise Imaging and ECM efforts separately simply creates a set of additional silos that ultimately needs to be integrated and consolidated. The path to true health data interoperability is best achieved when both Enterprise Imaging and ECM efforts are considered together, complement one another and even share the same underlying technology infrastructure. That's what Healthcare Content Management (HCM) is all about.

For more information on successful Enterprise Imaging strategies, download the eBook: *Enterprise Imaging: See What You've Been Missing*

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Healthcare Content Management – an enterprise system for all unstructured patient content

Just like an EHR is an enterprise system for managing discrete patient data, HCM is an intelligent enterprise system for managing all unstructured patient content – from DICOM and non-DICOM medical images to clinical documents and photos. Furthermore, HCM is the most effective way to combine this content with EHR discrete data to improve integration, security and reporting while gaining better control of costs.

An HCM framework consists of six essential pillars or entry points, each of which advances a healthcare provider down a path to total integration and interoperability of unstructured content. These six pillars are **Capture**, **Manage**, **Access**, **Exchange**, **Explore** and **Optimize**.

Capture: The Capture entry point represents the onboarding of image and document content in various ways that are often required in healthcare.

▸ Scan, fax, print-to-image, email, Web forms, mobile, interface, Web services, etc.

▸ Digital photos

▸ PACS conversions/migrations

▸ Modality to VNA, PACS or EHR

Manage: The Manage entry point allows healthcare providers to take ownership of the unstructured content and associated workflows necessary to manage, store, move, access and share HCM content.

▸ Image orchestration from modalities to VNA and/or PACS

▸ DICOM tag mapping/morphing

▸ Health record workflows such as scheduling, registration, HIM, patient finance, etc.

▸ Simultaneous management of storage infrastructure for all unstructured content including documents, digital images, videos, DICOM and non-DICOM medical images, etc.

Access: The Access entry point represents the viewing of image and document content in various ways by key clinical stakeholders throughout a healthcare enterprise.

▸ Enterprise-wide access to image and/or document content for clinical reference in one, consolidated view

▸ Diagnostic viewing of medical images by radiologists, cardiologists or other specialists

▸ Federation capabilities that provide access to disparate silos of content not yet migrated

Exchange: The Exchange entry point represents the sharing functionality of both medical imaging and ECM-related content using the same underlying technology infrastructure.

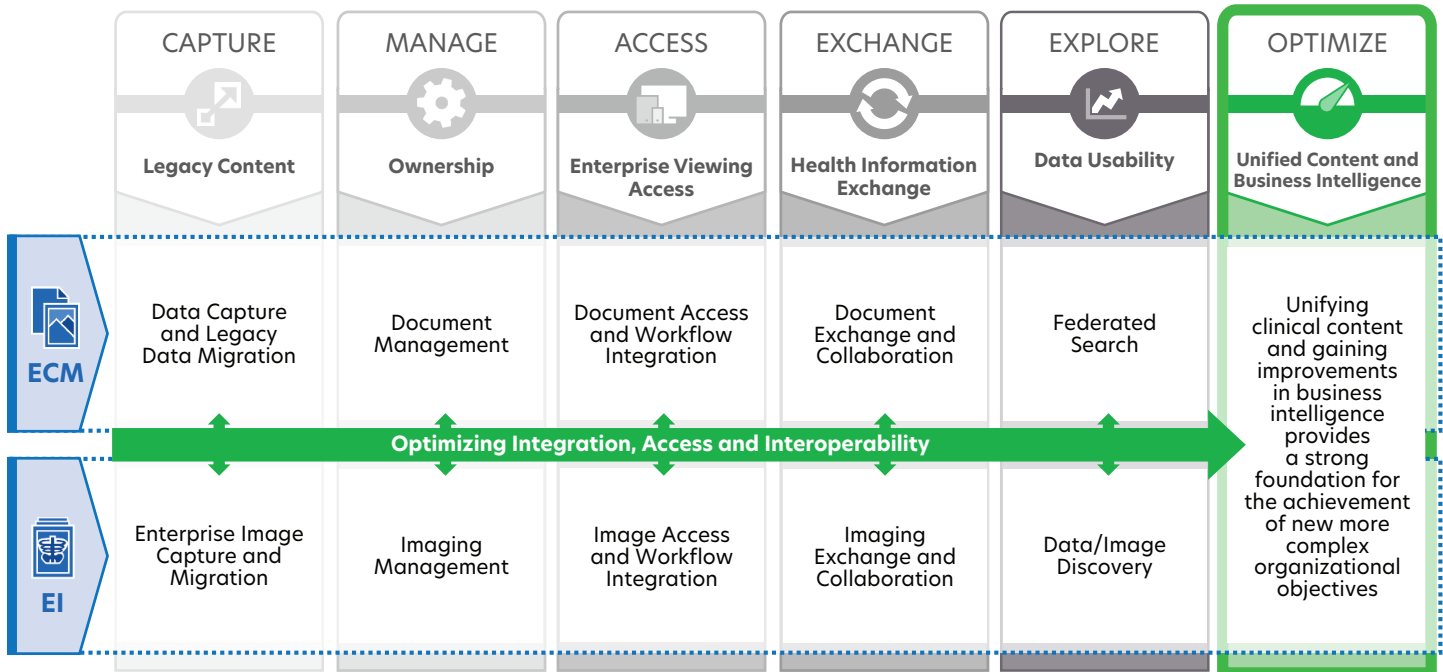▸ Share imaging and ECM content between users, affiliates and external, unassociated facilities

Explore: The Explore entry point represents the ability to federate Enterprise Imaging and ECM components.

▸ Supports the federation of ECM documents with XDS (Cross Enterprise Document Sharing) and the VNA, which enables enterprise-wide sharing of all unstructured content

▸ Supports the capability to discover both data and imaging studies relevant to patient care

Optimize: The Optimize pillar represents the improvements in data analytics, business intelligence and population health management that can be realized when all unstructured clinical content is unified.

▸ Enables easier, accelerated completion of more complex organizational objectives

CAPTURE	MANAGE	ACCESS	EXCHANGE	EXPLORE	OPTIMIZE
Legacy Content	Ownership	Enterprise Viewing Access	Health Information Exchange	Data Usability	Unified Content and Business Intelligence

	CAPTURE	MANAGE	ACCESS	EXCHANGE	EXPLORE	OPTIMIZE
ECM	Data Capture and Legacy Data Migration	Document Management	Document Access and Workflow Integration	Document Exchange and Collaboration	Federated Search	Unifying clinical content and gaining improvements in business intelligence provides a strong foundation for the achievement of new more complex organizational objectives
	Optimizing Integration, Access and Interoperability					
EI	Enterprise Image Capture and Migration	Imaging Management	Image Access and Workflow Integration	Imaging Exchange and Collaboration	Data/Image Discovery	

Winds of change drive need for HCM

HCM represents a paradigm shift in healthcare when it comes to the management of unstructured patient information. It's a new way of thinking about how to harness and embed this content into everyday clinical workflows to ensure the value of this data is fully realized. The biggest obstacle a healthcare provider will likely face in its HCM journey is the tendency to fall back on traditional ideologies which will inevitably lead toward investments in additional siloed systems. However, we're living in untraditional times, and untraditional times require revolutionary solutions.

The continued implementation of unintegrated point solutions has limited value in an era where healthcare is striving to achieve true interoperability. The need for a systematic enterprise approach to unstructured content and image management is undeniable and validated by numerous market dynamics present in healthcare today.

The Learning Healthcare System – A concept originally defined by the Institute of Medicine in 2007, The Learning Healthcare System (LHS) is an ecosystem where all clinical stakeholders securely, effectively and efficiently contribute, share and analyze health data and create new knowledge for consumption by a wide variety of EHRs. The ultimate goal is to support effective decision-making leading to improved patient outcomes. However, the LHS is also expected to result in lower healthcare costs by better identifying and reducing waste and preventable events. More and more healthcare providers are turning to the LHS concept as value-based care becomes the norm. Delivering on this ideal requires efficient access to and exchange of all types of patient content, making a sound HCM infrastructure and processes imperative.

The Real-Time Healthcare System – Similar to the LHS, the Real-Time Healthcare System (RTHS) is a concept defined by Gartner Group that focuses on improved intelligence of health IT systems. The RTHS disrupts the classic healthcare delivery model by creating much more information awareness and adapts better to both the need of the patient as well as emerging technologies. Systems that support the RTHS need to be more collaborative, mobile and will demand high service levels and availability. Once again, an HCM strategy and infrastructure aligns well with this model.

Patient Safety, Cybersecurity, Big Data – Frost and Sullivan also recently produced a report titled **10 Reasons Why You Need Healthcare Content Management**. The firm sees immense potential for an interoperable HCM platform to yield positive impacts on patient safety, cybersecurity, Big Data and more.

For example, HCM can help improve patient safety by creating a more effective flow and exchange of patient information that can shave precious minutes off in the trauma center, advance patients through emergency protocols more quickly and reduce redundant imaging exams that can unnecessarily expose patients to additional radiation and treatment delays. Similarly, HCM can help improve cybersecurity by applying security protocols holistically to all unstructured content. Big Data and analytics initiatives can also be enhanced by HCM by ensuring these efforts are based on the most complete set of information available.

Ultimately, Frost and Sullivan describes an HCM Framework as a necessary building block to optimize the EHR platform within healthcare organizations. They recommend more healthcare providers look to maximize their EHR investment by deploying HCM technologies to content-enable their EHR, improve availability of patient information and enable data liquidity.

HCM versus Clinical Content Management (CCM)

Several technology vendors may claim to provide an HCM infrastructure. However, what most of them deliver, in fact, is Clinical Content Management (CCM). Some might call the difference between HCM and CCM mere semantics, but in reality, the variations in these two types of approaches are profound.

CCM solely focuses on content and image-enabling the EHR. The CCM approach is narrow in its vision and does not extend access to patient content to other key clinical stakeholders throughout a healthcare enterprise that don't have access to an EHR or don't use this system as their primary automation tool. These stakeholders include a variety of specialty (radiologists, cardiologists, HIM professionals, etc.) and financial personnel (AP/AR, etc.) that regularly require streamlined access to clinical content.

Within each of these departments there is a need to move patient information and content around for collaboration, orchestration and approvals. Good examples include image orchestration from different modalities, pharmacy order management for health systems struggling with order entry automation and scheduling automation for routing of prerequisite patient documents from a referring clinic to an acute care hospital for surgery or an exam.

HCM goes beyond CCM by content enabling the entire enterprise – not just the EHR. Business and clinical content that is connected to the EHR is also made available via alternative access points for other key stakeholders to view. HCM tools enable the flow and governance of content prior to access of integration to systems such as an EHR or other departmental systems. An HCM framework can also apply permission-based rules to content both inside and outside the EHR, ensuring all users only have access to the content they need. This capability improves the overall use of patient information across the care continuum while minimizing opportunities for security breaches and other security risks.

For more HCM drivers, download Frost and Sullivan's report:
10 Reasons Why You Need Healthcare Content Management

Since HCM can offer access to unstructured content in more ways, healthcare providers have more flexibility to respond to current and emerging challenges that are changing the landscape of healthcare delivery. Currently, only one vendor – Lexmark Healthcare – delivers a completely integrated Enterprise Imaging and ECM offering necessary to implement an HCM framework.

HCM benefits span the enterprise

Taking an HCM approach to harnessing unstructured content can have a dramatic impact on your healthcare organization at a technical, organizational and clinical level. The following are just a few of the benefits HCM can deliver.

Technical Benefits

Integrated storage layer – An HCM approach enables healthcare providers to leverage a common storage system to house DICOM and non-DICOM data. It allows ECM and VNA data storage within a unified virtual or physical storage layer on any approved storage platform available within your enterprise. This capability not only provides greater storage independence, but it also helps lower storage TCO by making expansion easier, faster and cheaper.

Enhanced XDS capabilities for ECM – An HCM framework provides sophisticated XDS for ECM assets. XDS is a standards-based way to manage the sharing of documents and images within, or outside of, your healthcare enterprise. XDS offers a federated document and image registry and repository to help create a longitudinal patient record regardless of the content's source location. This capability facilitates data liquidity and satisfies growing demands for secure information sharing throughout the care continuum.

Addresses interoperability needs – Healthcare organizations are constantly being challenged to meet mandates for health IT interoperability even though most systems aren't designed to work well with one another. An HCM framework provides a foundation for interoperability that helps providers be agile in execution of new technology processes and stay compliant with existing and emerging government mandates.

Technical infrastructure management – Healthcare organizations often struggle to keep their technical infrastructure current. They value opportunities for consolidation as it allows for a more cost-effective technical refresh to maintain system access and performance. An HCM approach simplifies the complexity of the technology infrastructure used to manage unstructured content. Through system consolidation and built-in integration, healthcare providers can enjoy simplified system management and maintenance.

Organizational Benefits

Merger and acquisition support – We're living in an era of rampant merger and acquisition activity among healthcare providers. In the U.S., healthcare organizations seek to merge in an attempt to improve economies of scale, address new regulatory demands or better serve patient populations. M&A activity often results in increased information silos due to newly acquired systems that need to be integrated. An HCM framework provides a foundation where newly acquired systems can quickly and easily be integrated to support the delivery of unstructured content to core clinical systems.

Optimizes value of existing health IT investments – Prompted by Meaningful Use, healthcare organizations have invested millions of dollars in elaborate EHRs and other clinical systems intended to better manage patient data. An HCM approach can help these organizations gain more value out of these systems by supplying them with more complete information and making them more user-friendly.

Clinical Benefits

Integrated visualization of medical images and documents – An HCM framework allows healthcare providers to leverage one, zero-footprint viewer for access to ECM, VNA and XDS document and image data for clinical reference. A combined viewer results in fewer interfaces, easier navigation (i.e. less clicks) and improved usability within the EHR. Every keystroke eliminated enables providers to focus more of their attention and energy on direct patient interaction. Furthermore, side-by-side viewing of both medical images and clinical documents enhances data visibility, which enables more accurate and rapid decision making.

Completes the patient picture – HCM enables more informed decision making by completing the patient picture within the EHR. The EHR becomes a more valuable and holistic tool when combined with HCM solutions. HCM provides access to all patient content missing from a clinician's natural line of sight or missing altogether from the EHR. Bringing all patient information together in one place helps streamline information access, enhance clinical decision making and ultimately improve patient outcomes.

Summary

Now more than ever, healthcare needs to leverage all unstructured and structured data together to fully enable informed clinical decisions. Access to this information across the care continuum and to various stakeholders is required for cost-effective and successful navigation of the changing dynamics of healthcare delivery.

Up to 70 percent of the data needed for effective and comprehensive patient care exists in an unstructured format. This infers the existence of a large chasm between the resources and effort expended by providers on EHR technology to manage discrete patient data and the work yet to be done to effectively bring unstructured content into the fold.

Enterprise Imaging is the optimal strategy for identifying, capturing and centrally managing and extending DICOM and non-DICOM medical images throughout the enterprise to core clinical systems like EHRs. However, it is just half of the unstructured content equation. Any Enterprise Imaging initiative should be implemented with an eye toward eventually building an HCM framework that adds ECM capabilities to a common infrastructure. Integration of Enterprise Imaging and ECM provides an enterprise system for managing all unstructured content and truly completing the patient picture.

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