How To Create A Patient Centric Clinical Repository

Healthcare providers faced with burgeoning volumes of medical data have two key challenges:

1) Creating a secure and scalable vendor-neutral repository that can store imaging studies and a diverse array of patient information; and

2) Equipping on-site and off-site clinicians with rapid access to patient-centric information that can enhance care in any environment and image-enable existing electronic medical record (EMR) systems.

This paper outlines the key requirements for an efficient enterprise-wide patient-centric clinical data repository and describes how access to relevant patient data and efficient data sharing can impact cost efficiencies, staff productivity and patient care. In addition to discussing on-site archiving solutions, we will also describe the option of purchasing a remotely hosted archiving service. This software as a service (SaaS) model carries a fee-for-use basis that can reduce overall expenses, provide expert IT resources and protect against equipment obsolescence.

Identifying Challenges a Modern Repository Must Address

Consolidating islands of storage

Healthcare providers often have dozens of specialized archiving systems. These dedicated systems increase acquisition and maintenance costs, while making it difficult to share information. Data silos can be so fragmented that even a simple task such as knowing the storage utilization status, or balancing storage across different departments, can be impossible. Replacing all of these systems is not financially feasible, but establishing a standards-based system-neutral, repository that serves multiple departments can eliminate future purchases of application-specific storage archives and gradually achieve consolidation of data.

Establish centralized access to diverse patient data

Storage silos with legacy architectures make it difficult for clinicians to access patient data scattered across the enterprise. In most healthcare systems, images may be located and accessed through departmental PACS systems (radiology, cardiology and others) while related patient documents such as lab reports, video files, JPEG images other content are stored in other clinical departmental applications. Typically data needs to be accessed from each system, which makes the process of collecting pertinent patient information both difficult and time consuming.

Additionally, the data must be viewable in a simple tool that is vendor agnostic, location agnostic, able to view on multiple platforms such as PCs and iPads, and easily integrated into any IT ecosystem. There should be considerations such as zero-footprint (no downloads needed) and intuitive interfaces to contribute to immediate access without training.
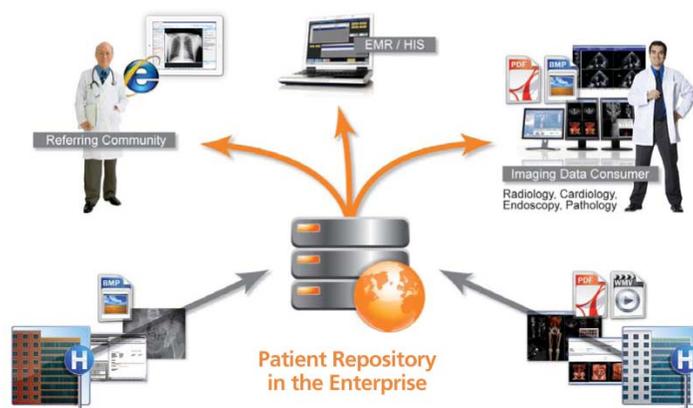
Lifecycle management redeploys storage space

Information lifecycle management software is an important asset for any data repository. This software manages data by applying storage rules defined by local regulatory requirements and the storage resources of each healthcare organization. Rules are specific to the type of exam since pediatric and mammography exams, for example, may need to be retained for longer periods than chest or extremity exams. This management process automatically deletes exams that no longer need to be stored and allows that space to be reused. This optimizes the return-on-investment for the storage infrastructure.

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Scalability enables greater flexibility, cost savings

Archive architecture needs to be modular and easily expandable to allow users to purchase the solution that meets today's requirements, while providing the flexibility to add more storage, computing power and connections as their needs evolve.

Built-in data security and business continuity/data recovery

In addition to security features, every medical archiving solution needs to be designed with business continuity and data recovery in mind. Government regulations worldwide require healthcare providers to meet standards that restrict data access to authorized users and guarantee backup copies of data that can be used in the event of an emergency or natural disaster. For maximum functionality, these capabilities need to be built into the original archive design.

Intelligence Indexing can reduce migration costs

While medical data must often be stored for many years, IT and storage technologies are often replaced every three to five years. Consequently, data is often migrated several times during its lifecycle. Modern storage solutions should be capable of integrating next-generation storage hardware and migrating data in a managed, automated, and secure way. Newly developed workflow solutions also offer the ability for intelligently indexing multiple platforms, providing seamless access by the end-users - mitigating the need for data migration.

Industry restructuring creates large-scale consolidations

The healthcare industry is restructuring through mergers, large private consortiums, and regional and national repositories for information exchange. This trend increases the need for large-scale solutions capable of delivering patient-centric data access to multiple facilities and locations, along with advanced features such as multi-site data synchronization. Interoperability between all the IT systems and the tools used by clinicians, is a critical aspect to consider.

Steps Required to Create a Patient-Centric Clinical Repository

Implementing a fully secure data repository solves the consolidation challenge; but the added challenge is to make it very accessible. Storage systems play an important role in delivering complete, accurate clinical information into the hands of healthcare professionals. Rapid access to relevant patient data can help enable a faster and more accurate diagnosis—and can ultimately enhance the quality of care.

Optimal vendor-neutral archiving solution can enable:
- Consolidate information from one or more sites or institutions and system to ensure interoperability
- Create patient-centric portfolio to facilitate exchange of information across the continuum of care
- Ensure data integrity and accuracy through security and standard-based architecture
- Access by clinicians regardless of device, platform or location
- Embedded or integrated into the organizations EMR or regional strategy

Collecting information requires support for industry standards

Effective information management requires the means to connect to—and collect—information from many different clinical systems. Integration among information systems has always been a challenge, but the healthcare industry has set up initiatives such as IHE (Integrating the Healthcare Enterprise) that permit more efficient integration through standards such as DICOM, HL7, XDS, PIX and others. Any healthcare information management or archiving platform should support these standard protocols and the related integration scenarios (known as IHE profiles). These platforms should also support general use interfaces that include transport-level industry standards such as FTP, CIFS and NFS.

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Creating a single patient portfolio

Collecting information does not automatically improve user access. Achieving more efficient access requires an intelligent platform that can recognize relationships between documents and systems and then consolidate information related to each patient into a single portfolio. This patient portfolio contains documents from multiple specialties, created in different formats, and acquired using multiple protocols. It can involve patient symptoms and medical history, radiology and cardiology exams, laboratory, pathology and radiology reports, and other data. Linking data with metadata creates a user-friendly clinical data repository, which delivers greater value to the healthcare organization and ultimately the referring physician and his or her patient. Tag morphing and other sophisticated techniques are employed to facilitate interconnection between incompatible devices.
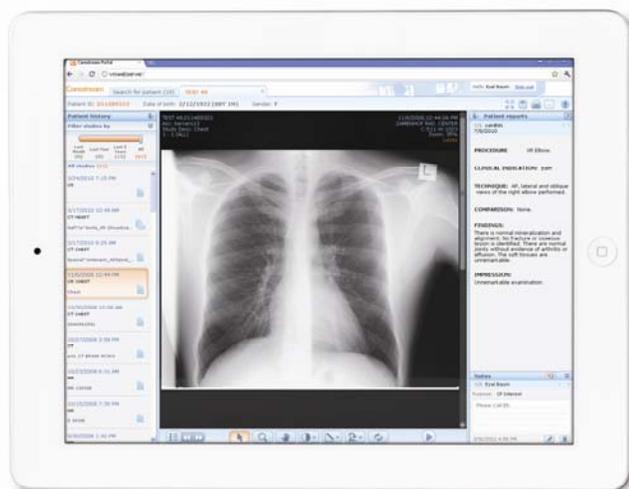
A modern clinical data repository offers access to the entire patient record, including clinical images as well as other types of records.

Consolidation faces a completely new challenge when the scope involves regional or national archives. Because the connected institutions are not always using a common patient identification domain, it becomes difficult to recognize how disparate documents relate to the same patient. This is another example of an industry-specific challenge for long-term archive systems: an effective clinical data archive must communicate with a Master Patient Index (MPI) system to reconcile patient identifiers and their documents.

Delivering security and data integrity

Data security goes beyond physical data center maintenance. Other factors such as data integrity, availability, monitoring, all require comprehensive design at network, storage and the application level.

Sharing information efficiently among clinical users

When considering enterprise-wide access by clinicians, such viewer must comply to standards and capable of integrating multiple data types. In addition, having an intuitive graphical user interface mitigates costly and timely training or maintenance. A zero-footprint, vendor-agnostic viewer that requires no download or training is the ideal compliment.

EMRs and Exchanges need to include images

Most EMR systems are designed to support a diversity of data types and sources, but they do not include imaging studies, which represent a significant role in a patient's medical record. Therefore, any enterprise wide repository and viewer must be embedded with the EMR or other exchange portals so that clinicians can easily access a holistic view of the patient record without separate log-on or dedicated workflow.

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CARESTREAM Vue Archive with Vue Motion Meets Evolving Needs

The CARESTREAM Vue Archive is a scalable, vendor-neutral repository that collects and receives images and data from a variety of systems such as imaging exams, lab and pathology data, video files, JPEG images and others to create a cohesive patient portfolio. Users gain rapid access to patient-centric information— regardless of the location of the data or the clinician.

Data is also synchronized to ensure that it is accurate when viewed. This Vue Archive has the capability to intelligently connect multiple platforms to present single patient worklist to the end-user, without replacing or migrating existing archives. This is accomplished by extensive tag morphing and indexing rules that standardize the way data is presented throughout the enterprise. Communication with other systems is enabled through support for DICOM, HL7 and XDS, as well as various IT standards.

The Archive supports a wide range of architectures and infrastructures, from departmental and multi-site archives to regional and national medical archive projects. Because it is fully scalable, installations can be expanded easily and affordably. Archive nodes can serve as backups for each other, creating an imaging grid that supports business continuity. Specialized management tools allow viewing of data at any level to reduce administrative costs and enable remote, web-based management of the archive.

It applies clinical information lifecycle management to the data based on clinical attributes such as the type of medical document, the type of imaging exam conducted, and the patient's age. This solution is vendor-independent because it supports all types of storage platform in any mix, radiology, cardiology, pathology and other clinical departments.

Carestream Health's encryption and security measures meet rigorous patient privacy regulations used by countries across the globe. The platform's multiple tiers of security mechanisms ensure data is accessed only by authorized individuals. It also provides monitoring of security threats and protects the system from tampering.

The need for real time imaging results for enterprise users commands intuitive solutions with simple access technology. CARESTREAM Vue Motion is a zero footprint viewer that can be easily accessed on the fly using only a web browser or information embedded in the EMR portal. Vue Motion is FDA cleared for iPad mobile use.

In conclusion, the CARESTREAM Vue for Vendor Neutral Archiving solution is a powerful and flexible combination of archive and viewer that satisfies the information management challenges of an evolving healthcare industry. It reduces operating costs while enhancing patient care. Its advanced functionality is best evidenced by its implementation at some of the largest healthcare systems and HMOs in the world.

Cloud Archiving Services Offers SaaS Model

The same functionality of the Vue Archive and Vue Motion is also available in the form of a SaaS solution called Vue Cloud Services. Purchasing archiving capabilities as a fee-per-use service lowers total cost of ownership by reducing the investment in capital equipment, security technology and management personnel. This cloud-based service also eliminates the danger of equipment obsolescence since Carestream Health continuously maintains and upgrades its data centers and on-site technology.

The company's Vue Cloud currently has more than thirty billion stored images worldwide, representing more than 1 PB of data. The company operates ten data centers with a mix of both public and private.

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