

SECURITY

ARCHIVAL
WHITEPAPER

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Executive Summary

Despite the widespread adoption of EHRs, most healthcare organizations continue to struggle with patient data that is scattered across legacy platforms. It's estimated that 50% of health systems are projected to be on second-generation technology by 2020 (Source: *IDC*), with drivers including mergers and acquisitions, vendor consolidation, application dissatisfaction, and product sunsets.

As healthcare organizations replace obsolete clinical record systems with next-generation EHRs, they must overcome the challenge of disconnected legacy systems. In many cases, this results in healthcare IT teams supporting multiple legacy systems. This is resource-intensive and can be quite costly given licensing, support, and maintenance needs. Further, paramount to EHR replacement are considerations surrounding legacy data retention, as most states require protected health information (PHI) be retained for 7 to 25 years, or even longer (Source: *HHS*).

Effective management of legacy data is critical to minimizing the disruption of EHR replacement and ensuring the transition does not compromise patient safety. Decommissioning legacy systems with a proven archival system reduces cost of labor, minimizes risk, ensures compliance, simplifies access and consolidates data.

How did we get here?

Healthcare is one of the fastest-growing segments of the Digital Universe, growing at 48% per year (compared to 40% per year for other types of data). Healthcare applications will be the principle driver of this data growth, with EHR penetration in the U.S. already over 80% and expected to reach 95% by 2020 (Source: *HealthcareITNews*). In addition, the market has matured to the point where EHR replacement has become commonplace, with 50% of health systems projected to be on second-generation technology by 2020.

As healthcare merger and acquisition (M&A) activity has been on the rise, it's important to understand the role

archiving plays in these transitions. 60% of healthcare-based M&A motivating factors are tied to key data archival considerations, data requirements, and areas of potential ROI. (Source: *Beckers Hospital Review*)

Diagnostic and other health applications are also growing with the increasing use of medical images and mobile health devices. Adoption of clinical next generation sequencing (NGS) applications will drive the re-evaluation of access, privacy, and data retention policies. Additional unstructured contextual content, such as video, audio, and text are being stored in medical records, making them even more data rich. (Source: *EMC Digital Universe*)

What are the main reasons for healthcare data growth? An International Healthcare Data Management Survey puts PACS applications as the number one reason, coming in at 63% growth, which comes as no surprise when just one 3D CT scan can consume 1GB of storage. This is followed by EHRs (54% growth) and scanned documents (51% growth). It is estimated that by 2015, the average hospital will have 665TB of data, 80% of which would be unstructured data like CT scans and X-rays (Source: *NetApp*). But with explosive growth comes unintentional consequences. The average hospital has 800,000 total records, but out of all of those, up to 12% are duplicates. The average cost of a duplicated medical record for an HCO is \$50 (Source: *Fox and Sheridan, health-information.advanceweb.com*), putting unnecessary strain on FTE roles in multiple departments such as HIM and Application Support. That's already over \$4 million that hospitals are wasting, and if the records aren't reconciled, the costs are even higher.

If those trends aren't staggering enough, it's estimated that 90% of the world's data was actually generated in the past two years alone (Source: *Science Daily*). With that, 80% of the data today is unstructured, in forms such as images, video, and email (Source: *NetApp*). So not only does one need to think about backing up regularly, but one also has to consider how long it's going to take to put the data back in case of an unrecoverable event. It is time to start thinking about an enterprise data storage strategy.

Why do we need to archive?

Proper data archiving is needed to uphold and maintain e-Discovery requirements. Electronic discovery (e-Discovery) is the electronic aspect of identifying, collecting, and producing electronically stored information (ESI) in response to a request for production in a lawsuit or investigation. Preserving the original content and metadata for ESI is required in order to eliminate claims of corruption or tampering with evidence during litigation.

Archiving also allows for legal decommissioning of legacy systems. The integrity of the data is vital. There are many threats to data quality, including hardware problems, data entry errors or carelessness. Because the decision to decommission can impact many people and departments, organizations require a well-documented plan and associated technology to ensure data integrity.

Additionally, archiving creates the opportunity to realize immediate return on investment (ROI). Legacy systems are often maintained merely to reference historical data. This kind of compliance and discovery strategy is expensive and comes with a high total cost of ownership. Our studies show that HCOs that archive their data typically have an 80-95% savings over maintaining their existing system licenses and infrastructure.

Lastly, it's critical to establish one location for all archived data. This creates consistency and ease of access to data across many user roles. When a question regarding legacy data arises, a single look at the archive should result in a rapid resolution and a thorough view of the information.

Benefits of Data Archiving



Reduce Costs: Streamlining the long-term storage of historical PHI now will save money in the long-run. Not only will it reduce costs paid for the support and technical maintenance of the legacy system, but it will also save on training new staff on the new system over the next 7-25 years. In addition, incorporating data archival efforts with a discrete conversion provides significant economies of scale.



Minimize Risk: Preserving historical patient data is the responsibility of every provider. As servers and operating systems age, they become more prone to data corruption or loss. The archiving of patient data to a simplified and more stable storage solution ensures long-term access to the right information when it's needed for an audit or legal inquiry. Incorporating a data archive avoids the costly and cumbersome task of a full data conversion.



Ensure Compliance: Providers are required to retain data for nearly a decade or more past the date of service. In addition, the costs of producing record for e-Discovery range from \$5K to \$30K/GB (Source: Minnesota Journal of Law, Science & Technology). Check with your legal counsel, HIM Director, medical society or AHIMA on medical record retention requirements that affect the facility type or practice specialty in your state.



Simplify Access: We all want data at the touch of a button. Gone are the days of storing historical patient printouts in a binder or inactive medical charts in a basement or storage unit. By scanning and archiving medical documents, data, and images, the information becomes immediately accessible to those who need it.



Consolidate Data: Decades worth of data from disparate legacy software applications is archived for immediate access via any browser-based workstation or device. Also, medical document scanning and archiving provides access to patient paper charts.

Potential Archival Scenarios

Scenario #1: Legal Requests for Records

A request for medical records has recently been submitted to the HIM department regarding a pending legal matter for a former patient. The request for records must meet the following criteria in order to be considered compliant with the request:

1. The request contains a litigation hold.
2. The records will involve multiple encounters with multiple providers across multiple data sources.
3. The records returned will need to include all preserved chart data within a particular range.
4. The nature of the request includes not only clinical instance data, but also patient and user audit data specific to the data source.

Scenario #2: IT Cost and Rationalization

Over the past five years, your organization has acquired multiple external physician practices, increased its overall software stack by 40%, and has undergone discrete data conversions with all of them. Your department is aggressively pursuing a reduction in licensing, maintenance, and support costs. As part of this IT optimization process, the following preservation standards must be implemented:

1. Any data that was excluded from previous data conversions must be accounted for (including detail, version, and audit data associated with previously-converted data).

Scenario #3: OIG Audit

As a growing Accountable Care Organization (ACO) and community-driven health center pursuing HRSA HIT grant funding, it is critical to ensure consistent and adequate HIT security controls are in place to protect sensitive EHR data and all PHI. This audit process could be triggered by:

1. Subpoena, a civil investigative demand, or notification of audit letter and would need to support:
 - Authorized access to all records, reports, and audits (including potential legislative inquiries)
2. Meaningful Use Incentive Payment Audits
 - Providing verification that providers receiving Medicare and/or Medicaid Meaningful Use incentive payments were entitled

Converted Data vs. Archived Data

There must be a clear distinction made between converted data and archived data, as the drivers and considerations for each are different. Retiring a legacy application and housing the data in an archival solution has markedly different requirements than migrating data from an existing clinical application to another.

Retiring legacy systems typically do not necessitate changing the “shape” of the data to fit a particular model. However, with EMR migration, data typically needs to be mapped and translated to facilitate proper import into the target system. Furthermore, as HCOs approach clinical system transition, it may be tempting to leave the data behind, especially if the data is tied to a system with a poor implementation and substandard data integrity. In addition, there may be reservations to coalesce the data with the existing system when not starting from a blank slate EMR implementation.

One thing is for certain, it is not a sound strategy to abandon the single most valuable asset HCOs possess (this data), especially given the endless usages of that data for reporting. Even if the data is not converted, a plausible scenario would be to house the data in an archival solution, providing contextual single-sign-on (SSO) to the archival system. This approach not only mitigates concerns around the reconciliation of the data, but is also allows for the sunset of the legacy system (and the licensing and maintenance costs that go along with it.) In addition, providing SSO affords continued simple access to the data.

Data conversions are not only an essential part of the clinical system migration process, but they also play a major role in the overall lifecycle of the source system. The primary goal is mapping source data elements to their matches in the target system. This can be accomplished by a 1:1 match between dictionaries or data sets so that converted data appears nearly identical in the target systems. This is critical for the clinical impact and workflow integration required to support a discrete clinical data conversion. However, complexities

often arise that require creative mapping solutions or even the building of new dictionary items in the target system:

Mapping & Translations

Data mappings and translations are a major component of executing a clinical data conversion and will ultimately drive the end-user experience and potential configuration requirements of the target system. Within an archival setting, however, none of these mapping distortions are applied to the data so that the source system's data is maintained and archived exactly as it was in the source system.

Custom Conversion Logic

The footprint of source data extracted in a data conversion will almost always be a subset of the total data available. The source data's shape also undergoes filtering and manipulation at multiple levels. Entire demographic population subsets and their clinical data, such as inactive or deceased patients, may be excluded from the extract. Certain data item status filters, such as voided or entered in error, may be applied to data elements across the board and, in some cases, entire data categories altogether, excluding these items from the converted data.

These types of manipulations and logic are not applied during a data archival, both to ensure that the full legal medical record is intact and discoverable and also so that source clinical data records will align with audit and metadata that will also be archived.

Detail and Version Data

Detail data is generally converted to some extent in a data conversion, but the conversion is not of the exhaustive scope required to maintain a full legal record history, integrate with audit records, and satisfy complex eDiscovery requests. The most recent version of a clinical item with select detail fields are generally brought forward during a data conversion setting. However, in an archival setting, all available data attributes from the source data are included intact and associated with the proper version record for that item.

Audit Data

Audit history is one data set in particular that tends to reside on its own island in the legacy system after migrating to a new system. It is almost never included in the clinical data conversion scope due to its higher technical complexity and lower immediate clinical impact. Due to its importance, legacy system audit data is considered one of the core data sets for archiving legacy source data.

How? VitalCenter Online – Archival!

VitalCenter Online – Archival (VCO Archival) provides easy access to data from legacy EHR systems. It can handle both clinical and PM data and satisfies legal requirements at the federal and state levels. It's a secure platform and complies with HIPAA and HITECH standards. VCO Archival can support dozens of source EHR systems, including Allscripts, MEDITECH, and eCW. It's easily accessible via a single sign-on through a web browser. The intuitive UI allows you to search for a patient and view data across multiple systems. All data is encrypted both in motion and at rest.

VCO Archival Approach

Once logged in, the application allows you to search for and view patient data organized both by legacy source system and by patient. Clinicians are able to navigate through a patient's chart and review active and historical patient data, such as problems, medications, vitals, allergies, orders, immunizations, and more. Documents, such as office notes or scanned images, can be stored as textual or image-based documents. VCO Archival also simplifies the way a patient's data is managed across multiple EHRs. In the patient's chart, users can utilize the patient grouping feature to seamlessly toggle between views displaying data from one EHR to the next.

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VCO Archival Security

- HIPAA and HITECH compliant
- Fully integrated auditing and audit reporting
- Secure by design
 - TLS (both internal and external network communications)
 - AES 256+ Symmetric Encryption (all data at rest)
 - Public/Private Asymmetric Encryption (for symmetric keys)
 - RFC 2898 (aka PBKDF2) Secure Salted Hashing (for login credentials)
 - Automated Key Cycling (at least 4 times a year)
 - Customer-Specific Cryptographic Keys
 - Isolation of Customer Data
 - No sharing of storage containers, such as databases
 - Support for federated authentication (SSO)

VCO Archival Reliability

- Multiple, state of the art data centers
- 99.9% uptime SLA
- Per-minute point-in-time restore capability for up to 35 days
- Triply redundant architecture
- Optional geo-replication

VCO Archival Product Features

Login

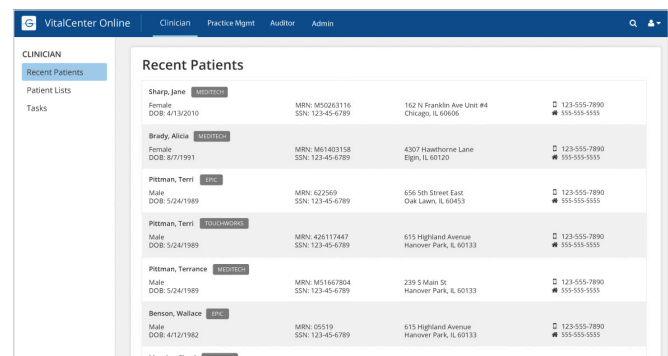
VitalCenter Online - Archival offers a combination of SSO, direct, and hybrid login methods, enabling seamless access to domain users (Clinician and PM roles) and provisioned access to external users (Auditor role). Access to the VCO Archival is available internally and directly from the source

system by utilizing a hyperlink from the source system that facilitates SSO integration and maintains patient context from the source system to VCO Archival. Access to VCO is also provided to external users by accessing a customer-defined domain address (custom domain).

Dashboard & Patient Searching

The Dashboard provides a direct landing point for potential direct users who may not have accessed the VCO archive using direct SSO integration with a patient in context. In a Clinician-based archive role, this functions as a running list of recent patients that the user has accessed, which helps reduce duplicated searching for commonly-viewed patients. In an Auditor-based role, this area functions as a secure whitelist of specific patients; they are assigned and available to the user based on their account provisioning.

Patient Searching is also available should a user need to change or manually look up patients. Patients can be searched for in the archive, filtered according to potential source systems they may have data in, supplemented by standard criteria such as first name, last name, date of birth, and SSN.

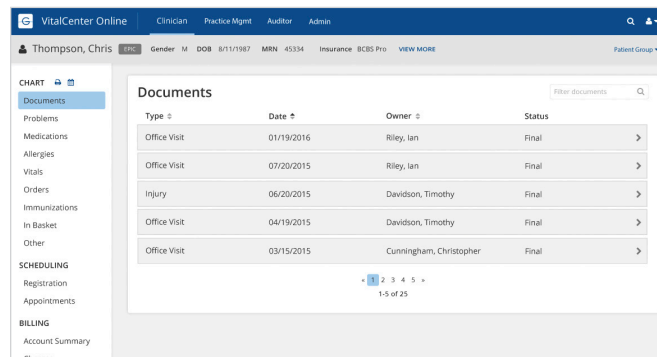


VitalCenter Online				
CLINICIAN				
Recent Patients				
Sharp, Jane	MRN: M50263116	SSN: 123-45-6789	162 N Franklin Ave Unit #4 Chicago, IL 60606	123-555-7890 555-555-5555
Brady, Alicia	MRN: M61403158	SSN: 123-45-6789	4307 Hawthorne Lane Elgin, IL 60120	123-555-7890 555-555-5555
Pitman, Terri	MRN: 622569	SSN: 123-45-6789	656 5th Street East Oak Lawn, IL 60453	123-555-7890 555-555-5555
Pitman, Terri	MRN: 420117447	SSN: 123-45-6789	615 Highland Avenue Hanover Park, IL 60133	123-555-7890 555-555-5555
Pitman, Terrance	MRN: M51667804	SSN: 123-45-6789	239 S Main St Hanover Park, IL 60133	123-555-7890 555-555-5555
Benson, Wallace	MRN: 05519	SSN: 123-45-6789	615 Highland Avenue Hanover Park, IL 60133	123-555-7890 555-555-5555
Morales, Floyd				

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Patient Chart

Unlike a data conversion, no additional data mapping is required up front in order to accommodate data archival storage for any of the VCO Archival data summary screens. All data elements in the VCO archive are easily retrievable across all user roles with the ability to filter, sort, and page through large data sets. The Documents section is the central VCO archive repository for all source system visit notes and scanned images. Full document and image version history is intact as was provided by the source data including content changes, amendments, and image annotations.



The screenshot shows the VitalCenter Online interface for patient Thompson, Chris. The 'Documents' section is active, displaying a table of document entries. The table has columns for Type, Date, Owner, and Status. The data is as follows:

Type	Date	Owner	Status
Office Visit	01/19/2016	Riley, Ian	Final
Office Visit	07/20/2015	Riley, Ian	Final
Injury	06/20/2015	Davidson, Timothy	Final
Office Visit	04/19/2015	Davidson, Timothy	Final
Office Visit	03/15/2015	Cunningham, Christopher	Final

Problems

Problems are available in the VCO archive, providing summary fields and industry codification values for reference, discovery, and searching (such as ICD-9, ICD-10, and Problem Type). Problem category labels specific to the source system can also be implemented in the VCO archive to maintain user familiarity, and to reduce end-user training requirements.

Medications

The Medication category provides a full medication history across all potential medication entries and their statuses from the source system data set. Similar to Problems, Medication category labels specific to the source system can also be implemented in the VCO archive to maintain user familiarity, promote familiar terminology, and to reduce end user training requirements. These category labels can

be implemented based on current categories in the source system, or the labels can be augmented and consolidated in the archive.

Version History

The level of detail and breadth of detail data captured in the archive is comprehensive and supports underlying requirements for all potential data requests, ranging from clinical to audit-based. Record detail for virtually any shape of data, regardless of the patient modality (ambulatory/inpatient), can be captured in order to ensure a full and complete legal medical record. The detail fields displayed in the VCO archive are data source-specific, allowing archive details to expand and contract according to any source system and its associated data elements.

Patient Grouping

VCO Archival serves as one centralized and consolidated source of legacy system data for an entire organization. Patient Grouping enables users to quickly and easily switch between source systems for a particular set of patients that have been grouped together. Patient Groups can be managed within VCO Archival, giving system administrators the ability to create, edit, and manage patient groups in the VCO archive. Users can quickly view and select another data source to view for the current patient.

Clinical Items (Alternative Source)

Users are brought directly to the data category they were interacting with after switching to another source system within a patient group. Patient chart data is presented in the VCO archive according to the source system in context for the patient only, and the data is not combined across data sources into an aggregated chart view.

Additional Features

Features such as Print Chart and Encounter Date filtering across all data elements enable non-clinical users such as external auditors to locate, retrieve, and securely extract one or many complex archive record retrieval requests.

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The Print Chart feature allows a user to generate charts, including one or many data elements from the chart in combination with a clinically relevant date or range value.

The Encounter Date chart filter feature allows a user to apply a clinically relevant date or range value that will apply to all data elements in the archive chart.

Audit Information (Source System)

Audit data from one or multiple source systems is fully supported in the data archive with the level of granularity provided in the source data intact. Audit data specific to source system data can be filtered and exported based on dates or ranges relevant to a particular auditing request (e.g., encounter date).

The screenshot shows the VitalCenter Online interface for a patient named Thompson, Chris. The left sidebar lists various categories: Vitals, Orders, Immunizations, In Basket, Other, SCHEDULING, BILLING, and AUDITING. The main content area displays a table of audit actions:

Access Start	Access End	User	Data Source	Action
3/6/12 9:15 AM	3/6/12 10:29 AM	Johnson, Ben	TOUCHWORKS	Added Patient Group
3/6/12 9:15 AM	3/6/12 10:35 AM	Johnson, Ben	TOUCHWORKS	Viewed Allergy Summary
3/6/12 9:15 AM	3/6/12 10:35 AM	Johnson, Ben	TOUCHWORKS	Viewed Allergy Details
3/6/12 9:15 AM	3/6/12 9:15 AM	Johnson, Ben	TOUCHWORKS	Exported Clinical Chart
3/6/12 9:15 AM	3/6/12 9:58 AM	Johnson, Ben	TOUCHWORKS	Viewed Problem Summary

Audit Information (VCO)

All actions taken by any user with VCO are fully audited, integrated, and reportable. This not only includes the ability to access audit data specific to a patient's data source record, but also to supports audit and HIM requests. In addition, you can view VCO Archival audit data in aggregate form across multiple patients.

Practice Management

Patient Billing: The Practice Management portion VCO Archival highlights specific data categories, such as patient registrations, transactions, claims, patient charges, and account details. Record tagging in the Practice Management module of the VCO archive enables end-users to manage ongoing patient account activity and high-level reconciliation for A/R burndown (once the source system is no longer available).

The screenshot shows the VitalCenter Online interface for a patient named Thompson, Chris. The left sidebar lists various categories: Vitals, Orders, Immunizations, In Basket, Other, SCHEDULING, BILLING, and AUDITING. The main content area displays a table of Accounts Receivable data:

Date	Charge	Payment	Balance
11/22/2015	\$245.00	\$0.00	\$245.00
11/18/2015	\$536.00	\$0.00	\$536.00
10/01/2015	\$285.00	\$285.00	\$0.00
09/29/2015	\$125.00	\$125.00	\$0.00
08/01/2015	\$140.00	\$140.00	\$0.00
07/17/2015	\$408.00	\$408.00	\$0.00

A/R: In addition to the Practice Management archive role driving access to patient-specific data categories and version history, the Practice Management VCO Archival module also supports customer-based data, such as A/R aging reports and account summaries. Financial calculations can be implemented in combination with the Practice Management module to help replicate key outputs and reporting capabilities. Custom reports can also be implemented to help supplement additional outputs or data views, such as forecasting or budgeting.

How can we prepare for archiving?

Understand Your Legal Medical Record

It may seem a major and rather impossible detail to overlook, but define and know what will be considered the legal medical record for your organization? Consider and understand the following drivers that will impact and drive archival scope specific to both the industry and your organization.

- 1. Define Your Legal Record.** Identify and prioritize all of the required data sets that need to exist and/or complement each other in an eDiscovery, audit, or general data retrieval scenario. Call out any niche or custom data sets that will need to be included as part of the legal record.
- 2. State & Federal Requirements.** Understand the common requirements set forth both at the Federal and your local State levels. Patient modalities such as ambulatory and inpatient may have unique requirements within the same state or even at the specialty level (e.g., Pediatrics).
- 3. Data Purging.** Know what your strategy and process is for purging data records that have exceeded the required retention requirements. Of course maintaining all records over time is possible, but it comes with the bearing of potential costs for data and patient storage. In order to begin establishing a cost baseline and potential ROI outlook for an archival project it's important to know at what rate patient records may be purged from an archive.
- 4. Practice Management.** An area of critical scope and impact that will play a key role in maintaining ongoing relationships between clinical and financial data in the practice management system. There are almost certainly patient populations that may have been excluded from previous data conversions, but that fall into immediate archival scope. Don't just consider what exists in your current systems today, but also consider data (such as deceased patients) across all IT systems and the state of its generation.

- 5. Ledger Requirements.** A step up from patient level financials and practice management patient-driven data is ledger data. This data can typically be balance sheet oriented and provide balances, budgets, forecasts, and the overall condition of the bottom line in various aggregate fashions. This can be standalone applications, sub-modules of practice management systems, or even warehouse based data. Take the opportunity during an archival initiative to prioritize and plan out how this data will need to be maintained in order to support the organization's operational insight post-archive.

Conclusion

Bring your organization's data back to life.

Reintegrate and enhance the fidelity of your data on a secure platform, providing a unified user experience for all roles across the entire organization. Enable your clinicians, practice managers, auditors (internal/external), and system administrators to benefit from the value added and eliminate the technical debt present in the increasing demand and complexity of eDiscovery requests.

In the ongoing life cycle of the electronic health records movement, it's no longer adequate to be prepared to be electronic - be prepared to be prepared. Don't wait for the opportunity to simply react in the form of a legal matter of an OIG based audit.

Learn more about how VCO Archival can reliably and securely provide straightforward access to data from legacy systems by visiting <https://www.galenhealthcare.com/technical-services/vitalcenter-online-archival/> or contacting sales@galenhealthcare.com.