SURVEY REPORT

APPLICATION DECOMMISSIONING:

Best Practices for Data Migration and Archiving

FINDINGS FROM A SURVEY OF HOSPITAL AND HEALTH SYSTEM IT LEADERS

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TABLE OF CONTENTS

INTRODUCTION

After years devoted to the infusion of technology into clinical workflow, healthcare delivery organization CIOs have come to realize that their earlier adoption of best-of-breed strategies has rendered them vulnerable to security breaches, encumbered by an increasing number of data silos, and frustrated by duplicative functionality, sprawling infrastructures, dependence on institutional knowledge, and burdensome licensing costs.

As a result, CIOs are now turning to data archiving solutions to rationalize their complex healthcare information technology and system portfolios. While it may be perceived as a trivial task, data archiving is not as simple as it seems. Some may view successful archiving as simply having a raw data backup, yet this undermines the value and legal ramifications of the data. Archival solutions must retire not just core applications such as the EMR and EHR, but also LIS, RIS, and ERP, while making data accessible, accurate, and secure.

Galen Healthcare Solutions and healthsystemCIO partnered to survey the current market to gauge sentiment, distill best practices, and measure decommissioning priorities, weighing these against organization demographics. Accordingly, we surveyed 70 CIOs to identify trends in system transitions and archiving to obtain a better understanding of the factors that affect and drive health information technology application decommissioning and retirement.

Most large health systems have anywhere from

250–5,000

IT applications installed across the enterprise

Total cost of ownership can range between

$50–500 million

per year

40%–60%

additional incremental annual IT operating spend, on top of licensing costs

RESEARCH OVERVIEW

Survey Drivers: Insights from HIMSS 2019 Cybersecurity Survey and KLAS Legacy Data Archiving 2019 Report

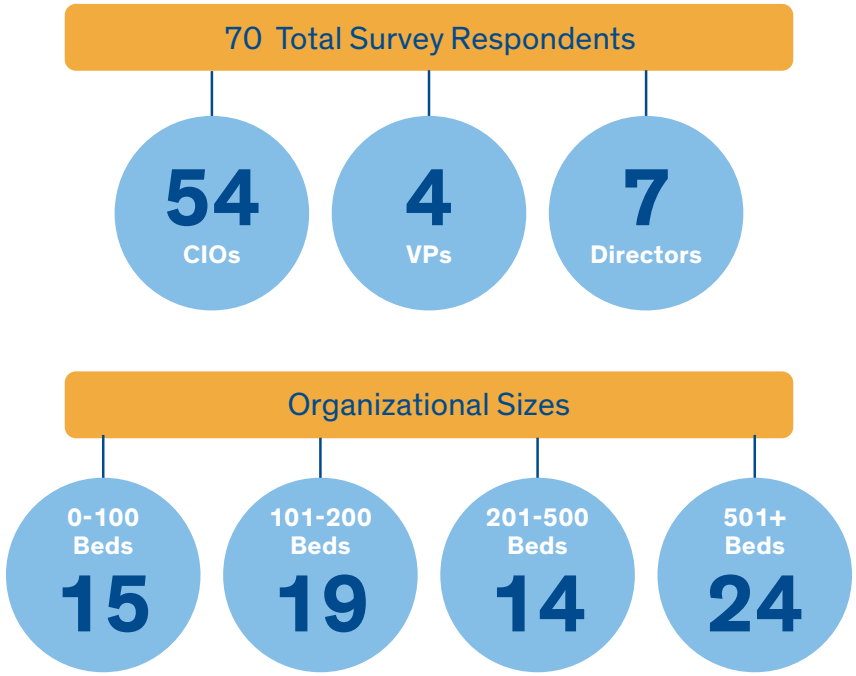
Older hardware and software are targets for hackers, ransomware, and thieves – putting data at risk of loss or corruption and breaches in security and privacy. Healthcare application decommissioning enables mitigation of risks (antiquated technology and security) as well as a reduction in costs (legacy system licensing, system support & maintenance) and preservation of access.

90%	of hospitals keep old applications running to preserve data when an application is replaced or retired.
85%	of HCOs who retired legacy IT systems and opted for health data archiving report positive financial impacts.
75%	of hospital IT staff time is consumed by legacy systems
300	is the average number of legacy applications healthcare delivery organizations are running.
430	HDO M&A transactions from 2014-2017.
4.3M	health records affected by 2017 breaches.
90%	of hospitals have experienced breaches since 2016.

Purpose

- Explore perceptions, attitudes, and needs of healthcare CIOs as they face the challenges of legacy application support, data migration, and archiving as they modernize their legacy healthcare information technology systems.
- Deliver novel insights to healthcare CIOs to supplement and inform their application portfolio rationalization strategy.

Respondent Demographics



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KEY TAKEAWAYS

1 Legacy Systems Demand CIOs Attention

Although the primary focus of CIOs is on implementation of the new system, an equal amount of their attention is directed to legacy system decommissioning - **especially regarding contract expiration and extensions.**

2 Almost all CIOs are Pursuing Application Portfolio Rationalization

For nearly all respondents, application decommissioning, portfolio rationalization, and information governance, are top of mind, with **97% having at least one legacy system in the portfolio that qualifies for retirement.**

3 Semantic Management is Invaluable to Data Migration Efforts

A sometimes-neglected responsibility of health information vendors conducting data migration is **semantic management, including semi- or full automation of dictionary, nomenclature and ontology mapping.** These are critical to the reduction of manual effort and invaluable in enabling clinicians to deliver continuity of care.

4 Data Conversion and Data Retention are Not Mutually Exclusive

A consensus among respondents suggests that data migration and data archiving should not be viewed as mutually exclusive in system retirement but as equally necessary.

a **Subsets** of data converted from legacy systems to **ensure clinical continuity**

b Archival of **all data** to satisfy l**egal retention requirements** and reduce costs

5 Balancing Data Availability and Legal Liability is a Challenge in Decommissioning

The majority of respondents recognize value in preserving discrete data, whether via migration or archiving. It is well understood that a **chart summary PDF of clinical data provides a snapshot only**, failing to integrate information with normal workflow and inadequate to eliminating concerns about release of information and clinical continuity.

KEY FINDINGS

97% have at least one legacy system in the portfolio that qualifies for retirement

39% are considering replacement of EMR/EHR, and **43%** are considering replacement of ERP

90% migrate **2+** years of data with **54%** migrating **5+** years of data

77% migrate Demographics, PAMI, and Results as part of data migration

Continuity of care is the primary driver for **89%** of those that pursue discrete data migration

84% consider both data migration AND data archiving, not one or the other

30% do not have a data archiving solution in place with **19%** currently evaluating

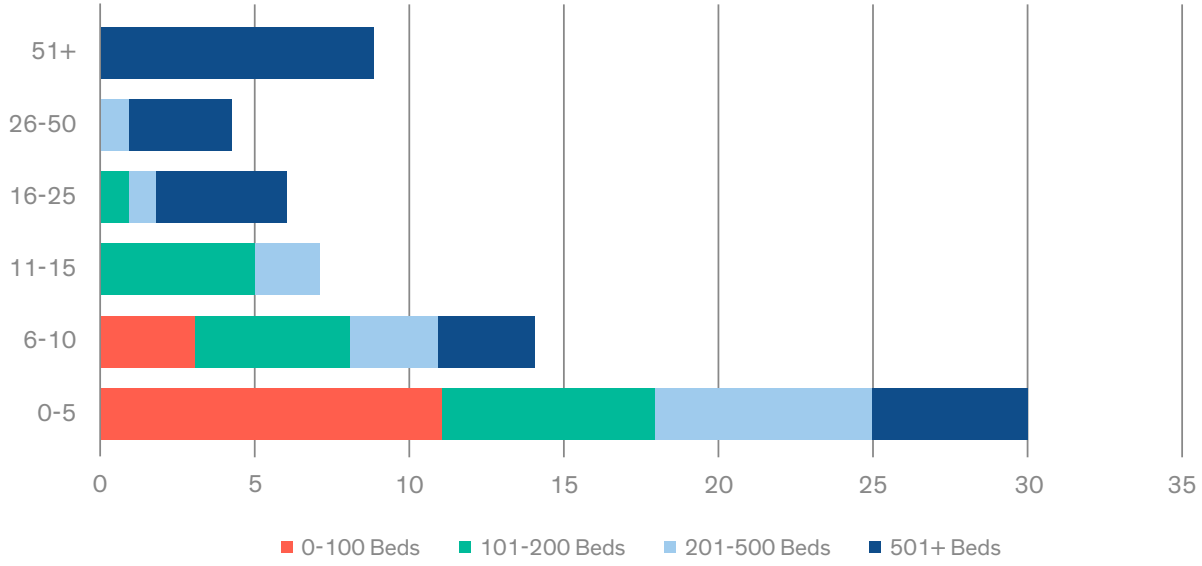
Relevant client experience is the most compelling factor driving data archiving vendor choice for **41%**

Legal requirements drive preservation of the data for **97%**

HEALTHCARE IT SYSTEM DECOMMISSIONING PRIORITIES SHIFT DEPENDING ON ORGANIZATIONAL DEMOGRAPHICS

Rationalizing the healthcare IT application portfolio can help streamline the organization to work more efficiently, reduce complexity, and lower total cost of ownership. After years of big bang, out of the box implementations, mergers and acquisitions, best-of-breed IT strategies, and antiquated & narrow legacy applications, many healthcare delivery organization IT operations are now dealing with a complex portfolio of disconnected applications, on incompatible platforms, often with overlapping functionality. The complexity of the application landscape is a major challenge. Keeping unused or underutilized applications on the network consumes resources. It takes up a large portion of the budget, leaving little room for innovation. Our findings confirm that the number and types of systems qualifying for retirement are closely aligned with organization size.

HOW MANY LEGACY SYSTEMS IN YOUR HEALTHCARE INFORMATION SYSTEM PORTFOLIO QUALIFY FOR RETIREMENT (INCLUSIVE OF EMR, EHR, ERP, HR, A/R, RCM, ANCILLARY SYSTEMS, LIS, RIS, ETC.)?



97% have at least one legacy system in the portfolio that qualifies for retirement.

The number of systems qualifying for retirement is very closely correlated with organization size.

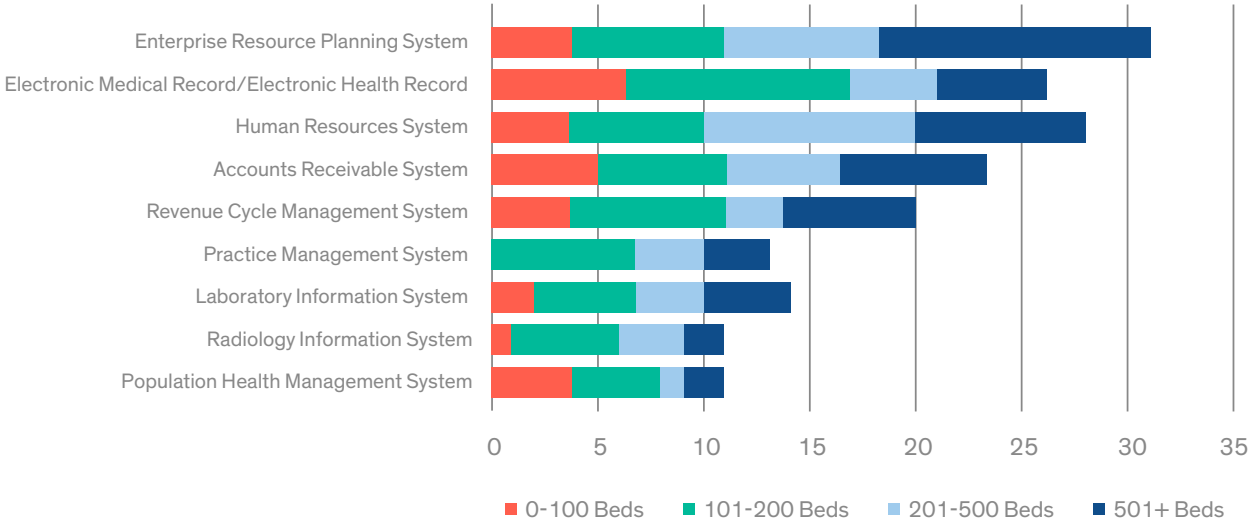
"We are not replacing, we are rationalizing. Post-merger, we found that we have two or more apps that do the same thing, and we are forcing the business to pick one."

"The organization is moving toward integrated solutions. We are slowly implementing these solutions to replace systems that are either interfaced (Anesthesia record) or have no communication with our EHR (cardio bypass)."

"We are replacing a number of systems as a result of an acquisition."

"Many application rationalization initiatives are in progress."

WHAT SOLUTIONS ARE BEING CONSIDERED FOR REPLACEMENT IN YOUR ORGANIZATION?



39% are considering replacement of EMR/EHR and **43%** are considering replacement of ERP.

Mid-sized organizations with 101-200 beds are targeting the largest and most diverse arrays of systems for retirement.

- More EMR/EHR systems are being considered for retirement in this group than the next two largest groups combined.

Org's with 201-500 beds are transitioning HR systems at a high rate, possibly indicating organization size driving a transitional growth phase.

System retirement in the largest organizations (501+ beds) is being more greatly impacted by business and administrative management, than by patient centricity.

LEGACY SYSTEM DECOMMISSIONING BENEFITS

IT

- Significantly reduce costs
- Preservation of patient data

Clinician

- Access archived patient information at the point of care
- Organize archived patient information to enable search and retrieval

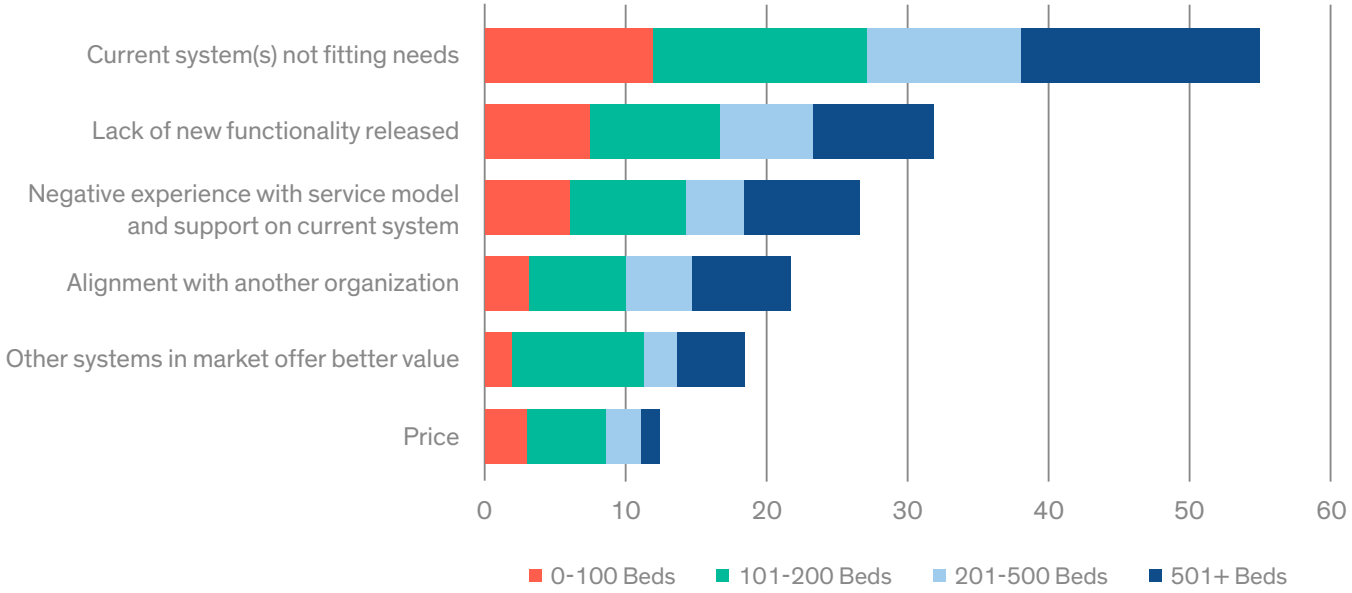
HIM

- Meet compliance requirements with immutable data, security, encryption and audit trails
- Support ROI and eDiscovery requests

TRENDS AND METHODS IN HEALTHCARE IT SYSTEMS TRANSITIONS

An upsurge of M&A and consolidation activity continues in the healthcare delivery organization space, driving the need for clinical data migration, clinical data archiving, and legacy application support. Effective management of legacy data is critical to minimizing the disruption of EMR replacement and ensuring the transition does not compromise patient safety. Unsurprisingly, a lack of functionality and usability in existing systems drive healthcare IT system transition. In addition, alignment with another organization due to consolidation through merger and acquisition also drives replacement. Further, recent research from the Center for Connected Medicine found that 60% of respondents cited moving to one EMR/EHR as an organizational step being taken to overcome interoperability challenges. It is evident that organizations are seeking to upgrade to an integrated solution to replace siloed best-of-breed solutions.

WHAT HAVE BEEN (OR WOULD BE) POTENTIAL DRIVERS OF EMR/EHR TRANSITION IN YOUR ORGANIZATION?



"We have a handful of systems that qualify for retirement due to unsupported infrastructure or software versions. In addition, we have a couple of systems that do not have a migration path, will require ripping and replacing, and will be fire-walled off until we do that. "

"The primary driver for EMR transition in our health system has been redundancy as a result of M&A activities."

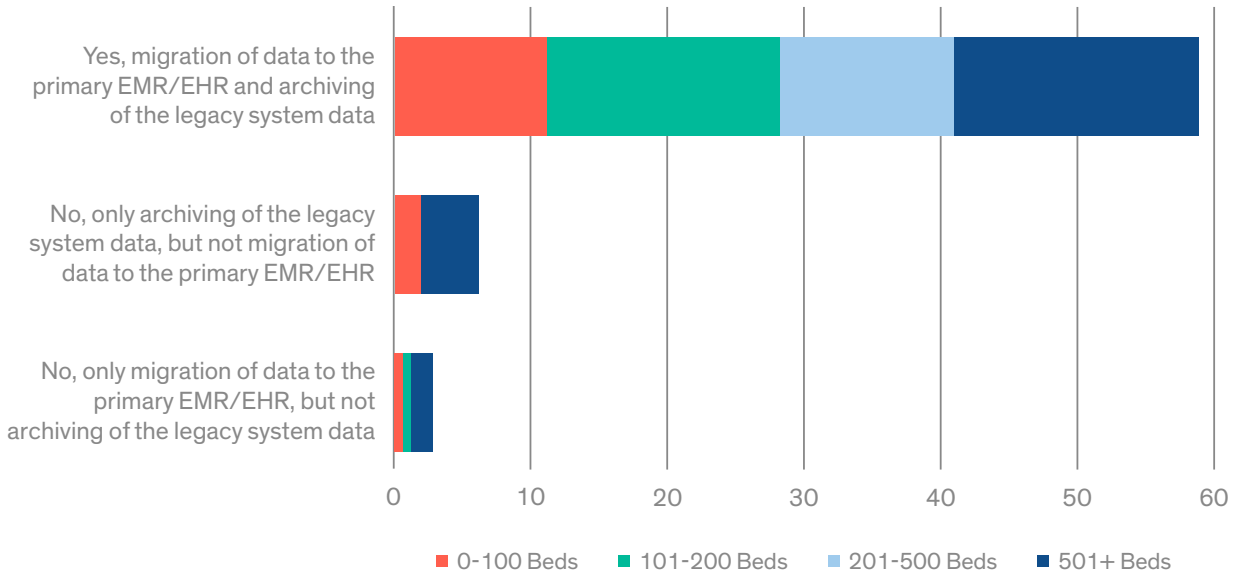
"We are sunsetting legacy systems as we move to an enterprise solution."

" We are moving to solutions that provide higher functionality and integration."

"We migrated from MEDITECH C/S to MEDITECH EXPANSE for new functionality."

"Our vendor is no longer supporting our existing EHR."

WOULD YOU CONSIDER BOTH DATA MIGRATION AND ARCHIVAL OF DATA AS PART OF AN EMR/EHR TRANSITION?



84% consider both data migration AND data archiving, not one or the other.

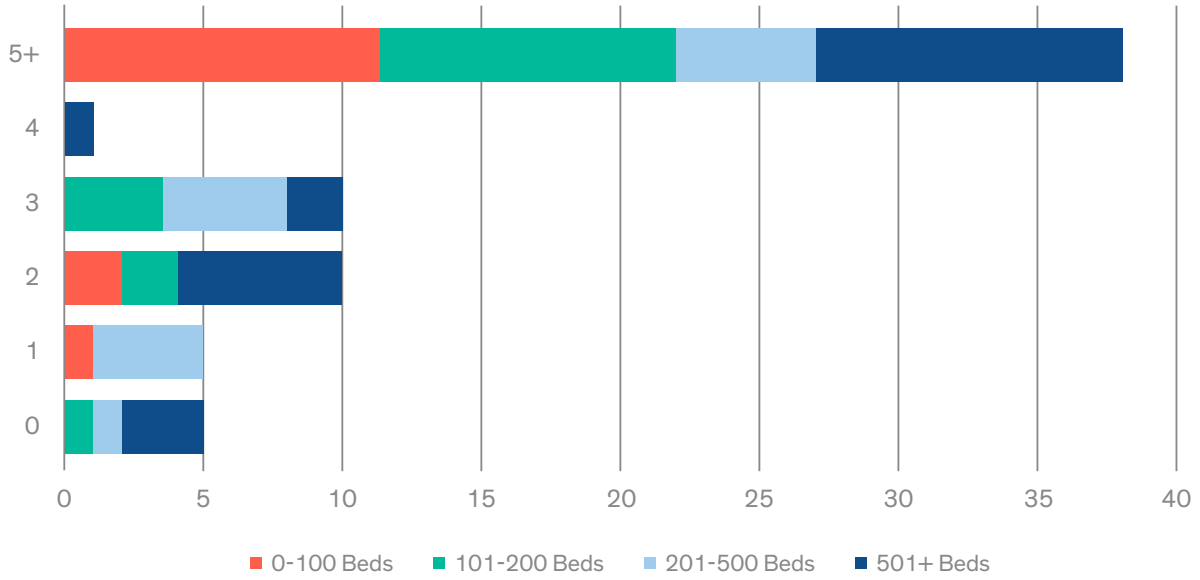
"Data migration and data archiving can be decoupled. The archiving could happen at a future date. There are always reasons to keep the legacy system around in the beginning of a new system's usage."

"Archiving is much more straightforward than conversion, especially given limitations on what can be converted, and the effort needed to map."

ATTITUDES AND APPROACHES TO DATA MIGRATION

It is generally understood that data migration minimizes provider disruption by facilitating continuity in workflow and automation, diminishes data re-entry costs, and maintains discrete data analytics and clinical decision support capabilities. This is evidenced by the majority of respondents citing continuity of care as the chief driver for data migration. Data mappings and translations are a major component of executing a clinical data migration and will ultimately drive the end-user experience and potential configuration requirements of the target system. Despite the time and resource-consuming nature of mapping and translation, respondents overwhelmingly supported migration of as much discrete data as possible, demonstrating an understanding of the value. Beyond the technical considerations, data governance and stakeholder agreement can be a significant challenge.

APPROXIMATELY HOW MANY YEARS OF CLINICAL DATA IS IT APPROPRIATE TO MIGRATE AS PART OF AN EMR/EHR TRANSITION?



90% migrate 2+ years of data with **54%** migrating 5+ years of data.

The results demonstrate an inverse relationship between organization size and the number of years of data they will migrate. This is likely due to pronounced cost constraints, increased complexities, and minimal capabilities with regard to the import and reconciliation of discrete data into the target system for smaller organizations.

"Three years is a good balance. It provides enough history within the new EMR environment for trending and decision support functionality."

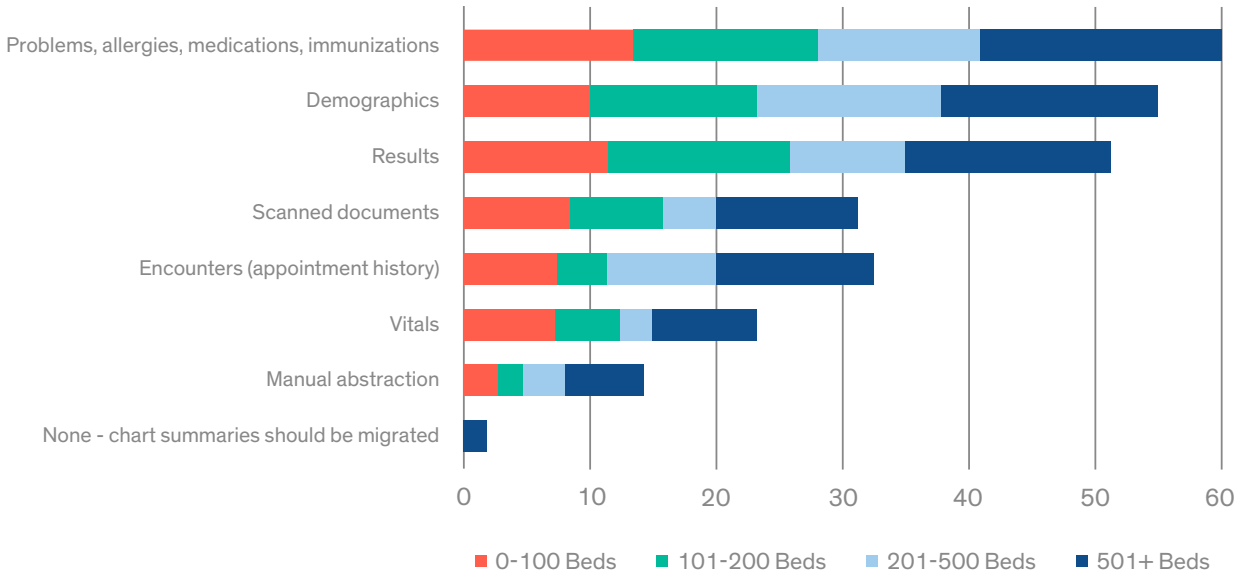
"The relative age of the data in the legacy system has a large bearing on the value of migration versus archive."

"It depends on the clinical data and quality. All trendable data, including lab and rad should be migrated, as well as allergies. Problem lists are junk."

"Taking virtually all of it would be ideal, if it could be done with good data integrity and cost-effectively, but cost is often a barrier."

"Providers want it all available. We will likely not migrate data to the new system but rather push it all to a document management system and convert to indexed PDFs."

WHAT TYPE(S) OF DISCRETE DATA IS APPROPRIATE TO MIGRATE AS PART OF AN EMR/EHR TRANSITION?



77% migrate Demographics, PAMI, and Results as part of data migration, with specialties driving decisions on data migration scope.

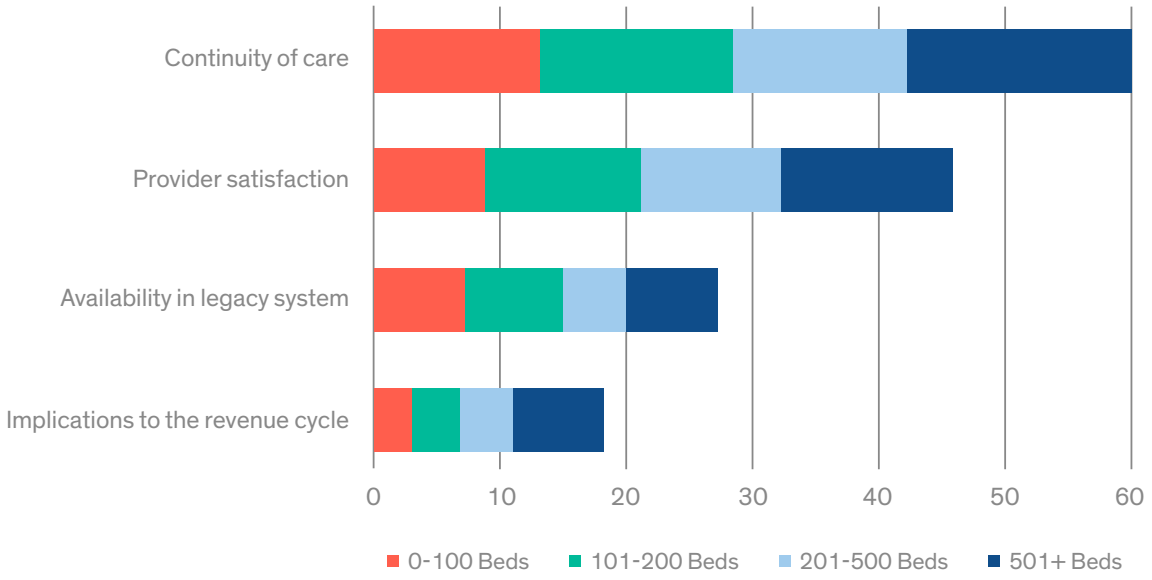
There is a high degree of uniformity of data types across organization sizes.

"Due to multiple legacy systems that are fragmented, and the time and money it would take to clean up, we are not migrating any legacy system data to our new EHR."

"All content should be retained to meet regulatory and legal requirements. However, not all content should be migrated into the future state EMR. Rather, an archive can be leveraged for content that is not needed to support daily operations and patient care."

"Because of research and submission to registries and consortiums, it is imperative that discrete data is available. This allows for data extracts and data mining to be automated."

WHAT ARE THE DRIVERS FOR DISCRETE DATA MIGRATION AS PART OF AN EMR/EHR TRANSITION?



Continuity of care is the primary driver for **89%** of those that pursue discrete data migration.

There is a high degree of uniformity of drivers across organization sizes.

"We are pursuing discrete data migration to ensure our ability to support reporting requirements, e.g., colonoscopies that have a 10 year look back, or mammograms that have a 1 year look back."

"As an academic medical center, a key driver for our organization is ensuring that our research efforts are not undermined by a system replacement, and as such, data migration is critical."

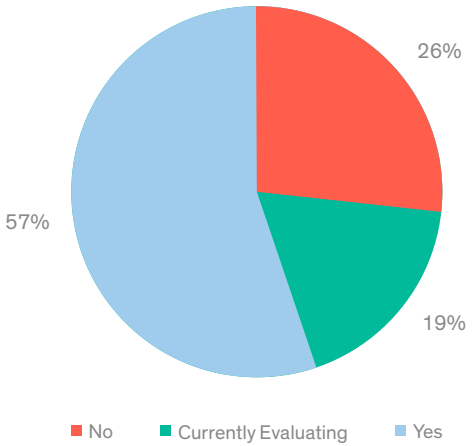
"We are doing a two-fold process: 1) conversion of most critical; 2) archiving of all required legally or for business reasons."

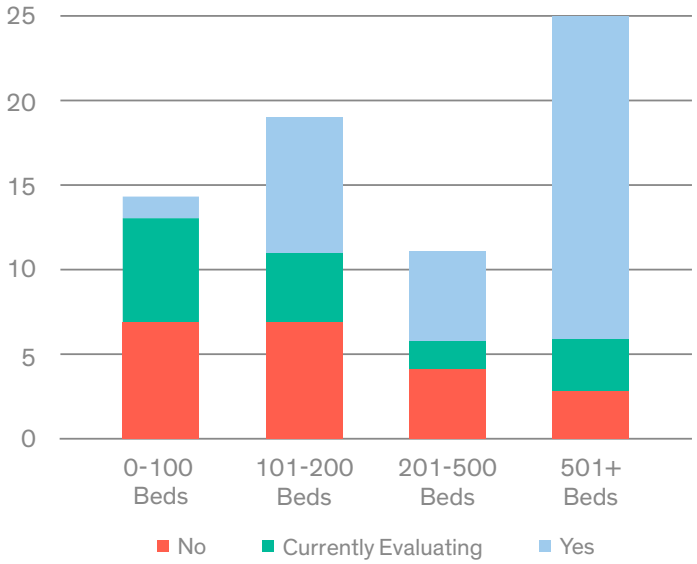
"We are leveraging integration with the HIE to access data pertinent to the patient in the new system."

ATTITUDES AND APPROACHES TO DATA ARCHIVING

Healthcare delivery organizations face unique requirements when it comes to retiring clinical systems, needing to preserve data fidelity and accessibility to comply with legal data retention and eDiscovery requirements. Accordingly, respondents cited legal compliance as the biggest driver for data archiving, underscoring the importance of not only archiving of the legal medical record, but also designated record sets, i.e., data not directly related to patient care, including contextual audit trails, referenced data in ancillary systems, data change and version history, and infrequently used and invisible fields. Surprisingly though, the majority of respondents cited relevant client experience as the most compelling factor driving selection of an archiving vendor, more than doubling technology platform. This implies that respondents prioritize speed of implementation. However, data archiving technology platform and vendor ETL tooling can arguably have the biggest impact on overall data archiving success, including implementation.

WHAT HEALTHCARE DATA ARCHIVING SOLUTION(S) DO YOU CURRENTLY HAVE IN PLACE?





30% do not have a data archiving solution in place with **19%** currently evaluating.

Only **14%** of org's with 100 or fewer beds have an archival solution in place.

- **42%** or org's with 101-500 beds have an existing archival solution.
- **76%** of large org's (501+ beds) have an archival solution in place.

LEGACY DATA BEST PRACTICES

Retire Legacy System

- Eliminate costs of maintaining both legacy and new system
- Improve provider satisfaction and data accessibility

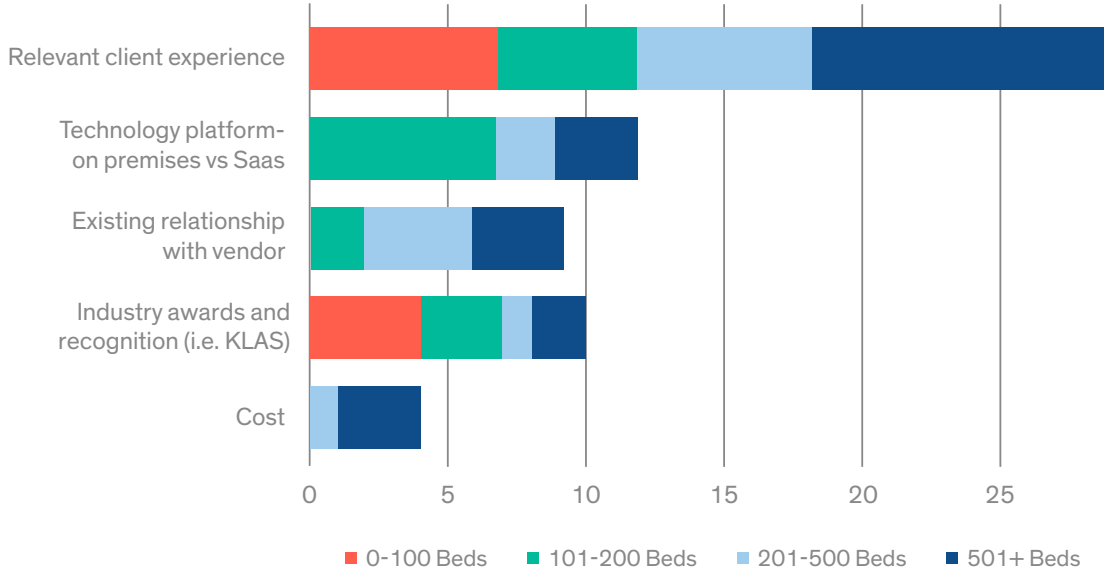
Data Migration

- Convert a subset of data from legacy system(s) to ensure continuity of care
- Minimize provider disruption with access to legacy data in new system

Archive Data

- Archive all data to satisfy legal retention requirements
- Data is easily accessible in new system with one click

WHEN SELECTING AN ARCHIVING VENDOR, WHAT IS THE MOST COMPELLING FACTOR THAT HAS (OR WOULD) DRIVE YOUR CHOICE?



Relevant client experience is the most compelling factor driving data archiving vendor choice for **41%** of organizations.

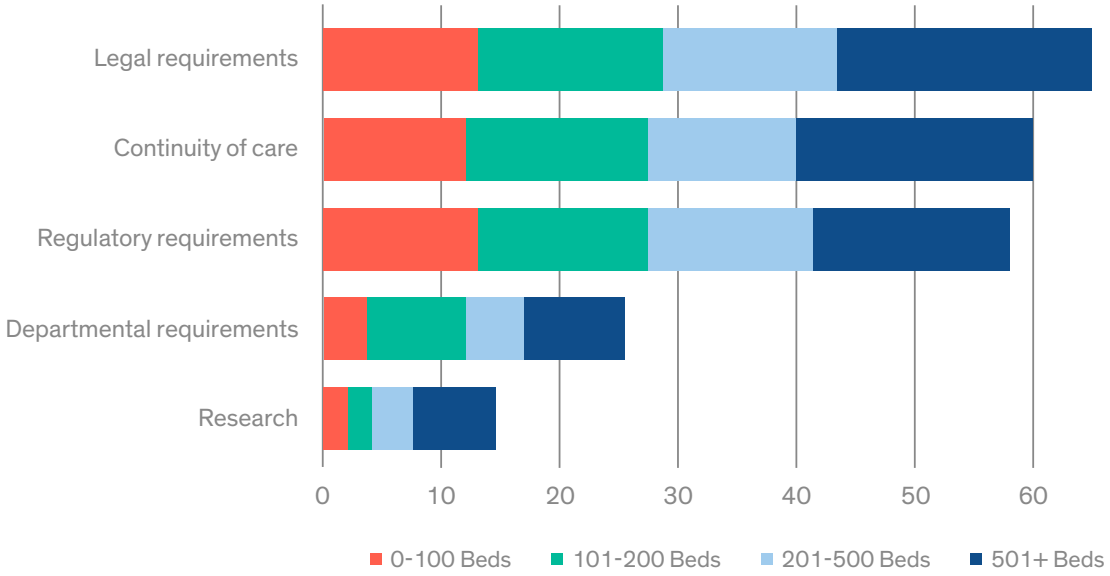
Cost of an archival solution is a significant driver for larger organizations with greater than 200 beds.

"We leverage our HIE vendor for data archiving."

"Our vendor archiving decision was driven by recommendations from our managing system."

"We went through a very thorough RFP process to select our vendor."

WHAT ARE THE DRIVERS FOR PRESERVING THE DATA?



Legal requirements drive preservation of the data for **97%.**

Continuity of care drives preservation of the data for **88%.**

Regulatory requirements drive preservation of the data for **86%.**

Drivers are relatively the same across different organization sizes.

SYSTEM TRANSITION APPROACHES

Maintain Legacy Systems

- Provider dissatisfaction
- High legacy system license, support, maintenance, & staffing costs
- Lack of data accessibility

Document Management System

- PDF of clinical data provides snap-shot only and doesn't offer integration with normal workflow
- Lack of discrete data resulting in release of information and clinical continuity concerns

Data Migration

- Minimize provider disruption through enablement of workflow & automation continuity
- Minimize data re-entry costs and human error
- Maintain discrete data analytics and clinical decision support capabilities

Data Archiving

- Comply with regulatory and organizational retention requirements
- Enable access to the data
- Increased satisfaction

CONCLUSION

APPLICATION DECOMMISSIONING IS A KEY PRIORITY FOR HEALTHCARE DELIVERY ORGANIZATIONS WITH SUBSTANTIAL RETURN ON INVESTMENT

Healthcare delivery organizations continue to upgrade their system portfolios, a process that creates a conundrum. Many systems must be decommissioned, yet much of the data residing in those decommissioned systems must be maintained and retrievable. The data that must be accessed is often sought by various departments (clinical, financial, administrative), each with its own set of needs and functional requirements for the post-production data lifecycle. The challenge for each organization is therefore to employ a records management strategy that concurrently ensures accessibility, security, and legal compliance. This despite the fact that an organization's capacity to preserve the integrity and completeness of the original record, especially the ability to recreate a copy of the record as it existed at the relevant time in question, may be compromised when legacy systems are decommissioned, and legacy data is archived. Our findings demonstrate that CIOs are aware that their ability to access robust legal and clinical archives can be affected by approaches to extraction, transformation, loading, and storage of data.

In closing, we believe a best-practice, risk-averse approach should provide the same level of access for all archived systems and data sets, and that the most cost-effective approach to the storage of legacy data without compromising accessibility or risking liability can be achieved with SaaS-native healthcare data archiving platform designed for the cloud from the ground up.

SURVEY RESPONDENT TITLES

ACIO Administrative Director and Chief Information Officer *Assistant Vice President* Associate CIO Applications **AVP & CIO** AVP, CIO ***Chief Information Officer*** CIO *CIO (interim)* CISO / Sr. Dir. Applications CMIO **Cmio/ CIO/CMO Community Hospital CIO** *CQO* CTO Deputy CIO **Director** *Director of Clinical Informatics* ***Enterprise Architect*** Epic Access Team Lead **Exec. Director of IT/ Informatics** Director of Informatics **I.S. Director** Interim CIO **Manager of CI** MGR Integration **Physician IT** *Regional CIO* *Retired CIO* Senior Advisor Innovation Institute **SVP&CIO** *SVP, CIO* ***SVP/CIO*** **SVP-CIO** *VP* VP & CIO *VP HITS & CIO* *VP- I&T Operations* VP, CIO **VP, I&T Operations**

PLACE OF WORK

Ascension Aspirus Baptist Health **Beth Israel Lahey Health** Blanchard Valley Health System **Bon Secours Mercy Health** Boulder Community Health **Brooks Rehabilitation** **CalvertHealth Medical Center** Cambridge Health Alliance **Care New England** *Carl R Darnall Army Community Hospital* **Campbell County Health** **Cleveland Clinic** Cleveland Clinic Florida **Cook Childrens** *Dayton Children's* **Deborah Heart and Lung Center** Evangelical Community Hospital **Flaglar Hospital** Franciscan Alliance **Galway Clinic** **Greater Baltimore Medical Center** **Golden valley memorial healthcare** *Grand View Health* **Halifax Health** **Hamilton Health Sciences** Harbin Clinic **Hospital for Special Surgery** Hunterdon Healthcare **Island Hospital** Kaweah Delta **Lurie Children's Hospital** Mackenzie Health **Medical University of South Carolina** Mediclinic Middle East **MedStar Health** *Memorial Hospital and Health Care Center* **Methodist Health System** Middlesex Health North Country Hospital **NorthBay Healthcare** Northwell Health **Osler Health Network** **Peninsula Regional Medical Center** *Piedmont Healthcare PA* ProMedica Health System **Rehab Hospital of the Pacific** Ridgeview Medical Center **Regional Medical Center** Seattle children's **Siskin Hospital for Physical Rehabilitation** South County Health **St. Jude Children's Research Hospital** *Tahoe Forest Hospital District* **Twin Lakes Regional Med Cntr** *UC Health* **UCI Health** UMASS Memorial Healthcare **VCUHealth** Washington County Hospital **Weeneebayko Area Health Authority**

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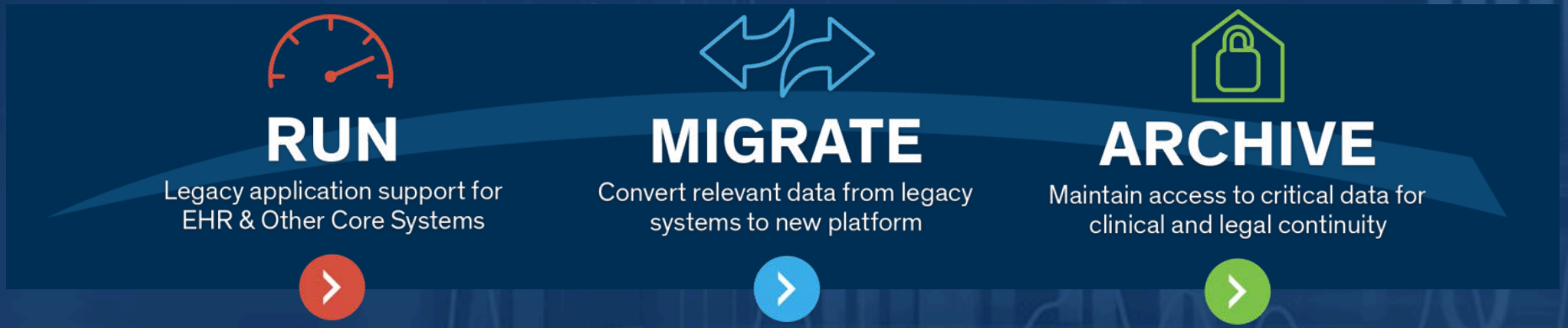

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