



Workflow Gaps in Enterprise Imaging

Workflow Management White Paper

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Executive Summary

Regional Health Systems are experiencing an unprecedented consolidation as they try to establish an Enterprise Imaging (EI) strategy to take advantage of their newfound scale in their local markets. Development of an EI strategy has proven to be very challenging due to segregated informatics systems, isolated imaging silos, and the reality of incorporating the next acquisition hospital or imaging center around the corner. One of many goals for EI strategy is to establish a unified patient medical record that is supported by the complete history of patients' medical imaging or any other information objects. Physicians and other provider stakeholders should never be in a position where they question the integrity or the completeness of their patient's record. The financial headaches of capital budget planning and the growing list of initiatives related to measuring quality, value, and performance are among the classic challenges that every provider is faced with while developing an EI strategy.

When assessing current EI technology within an Integrated Delivery Network (IDN), it is very common to see several instances of PACS (Picture Archiving and Communication System), RIS (Radiology Information System), Advanced Visualization (AV), and dictation systems that may be integrated with main Electronic Health Record (EHR) and other Electronic Medical Records (EMR) at ambulatory locations. In addition to the technology challenge, an IDN may be contracted with several Radiology groups in a region, each demanding various image access flexibility. CIOs are puzzled with system consolidation efforts due to the number of their vendor solutions requiring costly updates or replacement to meet the EI strategic requirements.

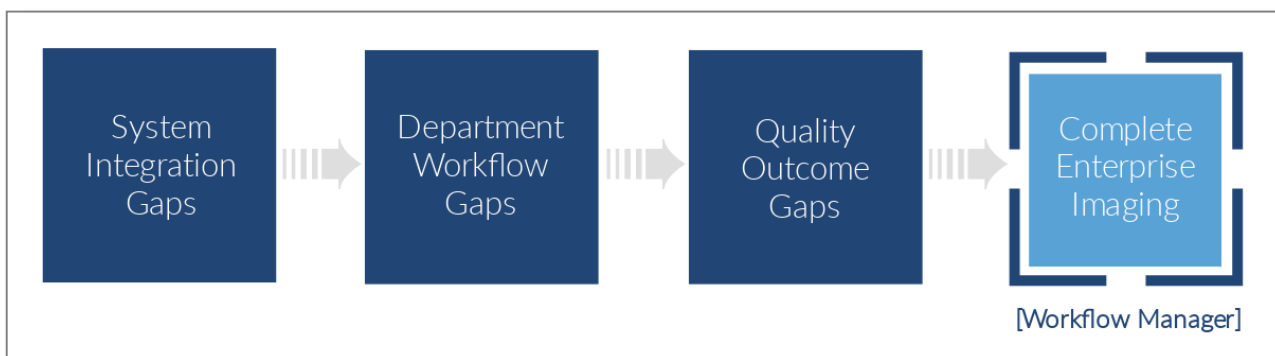
Many inherent functions driven by the conventional PACS (e.g., worklist, communication tools, clinical exam notes, etc.) are nearly impossible to duplicate in a different system once they are removed from their native PACS environment. Today's IDN

leadership, pressured with frequent merge and acquisition strategy, are challenged with time constraints and do not have the luxury to extend project timelines due to system incompatibilities.

We cannot address every aspect of the EI roadmap development in this white paper, but would like to provide some assistance for the early stage planning with technology known as Workflow Manager/Engine (WFM). This technology, whether procured as a single application or already available

within an implemented platform, allows healthcare providers to leverage existing imaging technology and establish early stages of an EI environment without major systems replacements. This technology provides a layer of flexibility and control when it comes to integrating a complex mix of proprietary systems and data. Instead of focusing on a rip-and-replace approach, IT and clinical leadership have the option to address immediate EI requirements while proactively moving towards a more mature model (see Figure 1).

Figure 1: Enterprise Imaging Maturity Model

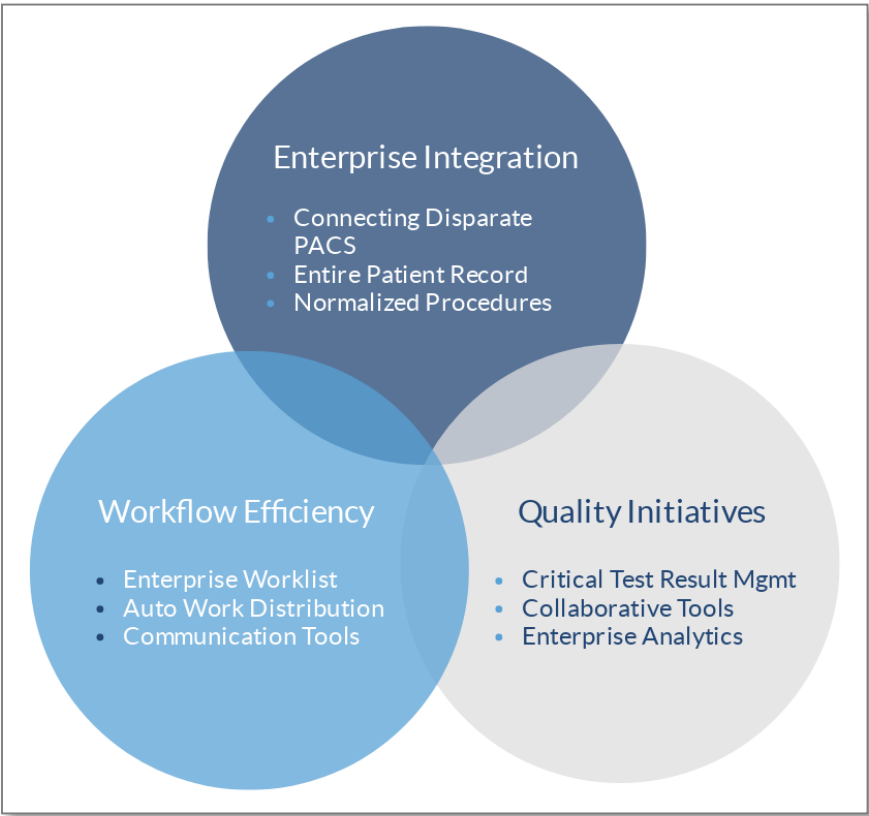


There are several key EI benefits that WFMs offer (see Figure 2) to healthcare organizations and each value will be explored within this whitepaper:

- Enterprise System Integration
- Enterprise and Department
- Workflow Efficiency
- Quality Initiatives

Enterprise Integration

Figure 2: Workflow Manager Benefits for Enterprise Imaging



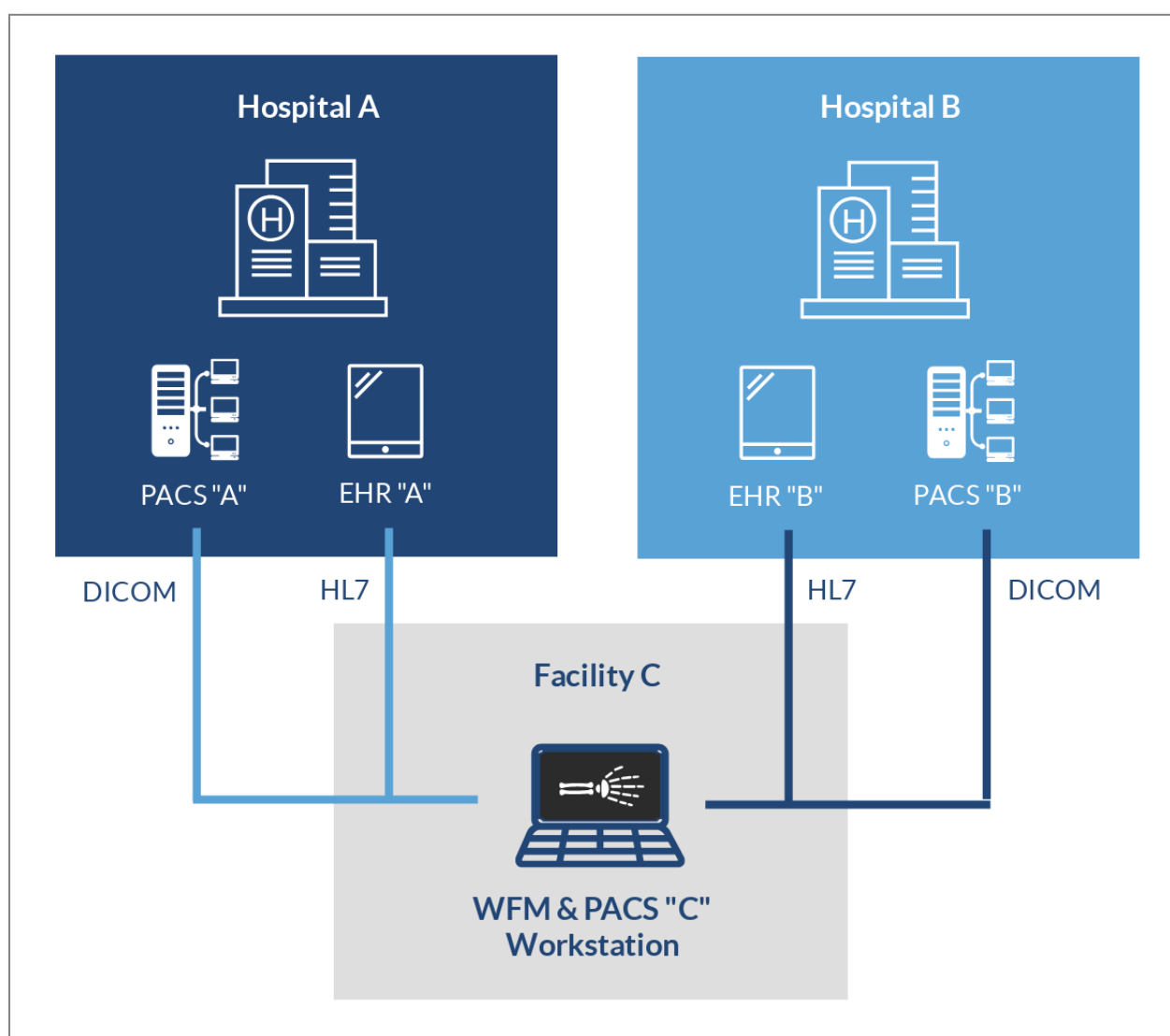
One of the key hurdles for healthcare IT leadership is to develop a viable financial plan and ROI for EI strategy that includes a Vendor Neutral Archive (VNA) as the center of enterprise image management. Due to the time and cost of image and data migration, many healthcare organizations are now

considering the idea of federating existing legacy systems to provide unified access to all imaging. Some of the VNA vendors offer a built-in WFM module, and this functionality is quickly becoming a necessity as the early stages of EI roadmap are implemented.

Since WFM functions like an interface engine, the idea of integrating legacy systems prior to a full VNA install and data migration has become a feasible option (see Figure 3). It offers a relatively short implementation cycle with the immediate reward of an aggregated view of patient's complete record and a unified reading

environment for radiologists. As the long-term EI roadmap is developed healthcare IT leadership is able to adopt a phased technology consolidation plan that achieves early ROI, and operational/clinical leadership are able to focus on quality initiatives that previously were not achievable.

Figure 3: Workflow Manager Common Level of Integration



Connecting Disparate PACS

Today's typical IDNs are managing more than five hospital facilities plus imaging centers with numerous PACS(s), EMR(s), and RIS(s) instances with potentially 2-3 standalone dictation systems supporting each site. To bring all these solutions to a single reading environment decision makers are typically pressured to consolidate many systems, usually end-of-life applications, to a single enterprise solution. This approach can be extremely costly and time consuming.

However, WFMs can federate existing image repositories and clinical source systems to a unified reading solution. The mix of applications can be slowly sunsetted to maximize the system lifecycle while maintaining operations. WFM solutions essentially work like interface engines capable of pre-fetching procedure-relevant imaging from legacy PACS and presenting a longitudinal view of the patient's medical history. In addition, WFMs drive various PACS viewers from a single workstation. If an organization has started to phase in an Enterprise Diagnostic Viewer (EDV), WFM can

drive both the (EDV) and legacy PACS(s) in the transitional phase, and ultimately remain as the universal workflow engine going forward.

Patient's Clinical History

The all-encompassing view of the patients' clinical history has become of utmost importance for providers, specifically dictating radiologists relying on all relevant priors. During a patient care episode a Radiologist having to juggle multiple applications to review clinical history, labs, or outside imaging has never been safe or efficient. Radiologists and treating physicians, more than ever, rely on all clinically relevant data to be presented in a unified Graphic User Interface (GUI). Having access to the patient's complete record has become the fundamental element in value-based healthcare. Searching several EHR/EMRs or clinical applications for relevant history is no longer a feasible option nor is "swivel chairing" between different PACS workstations.

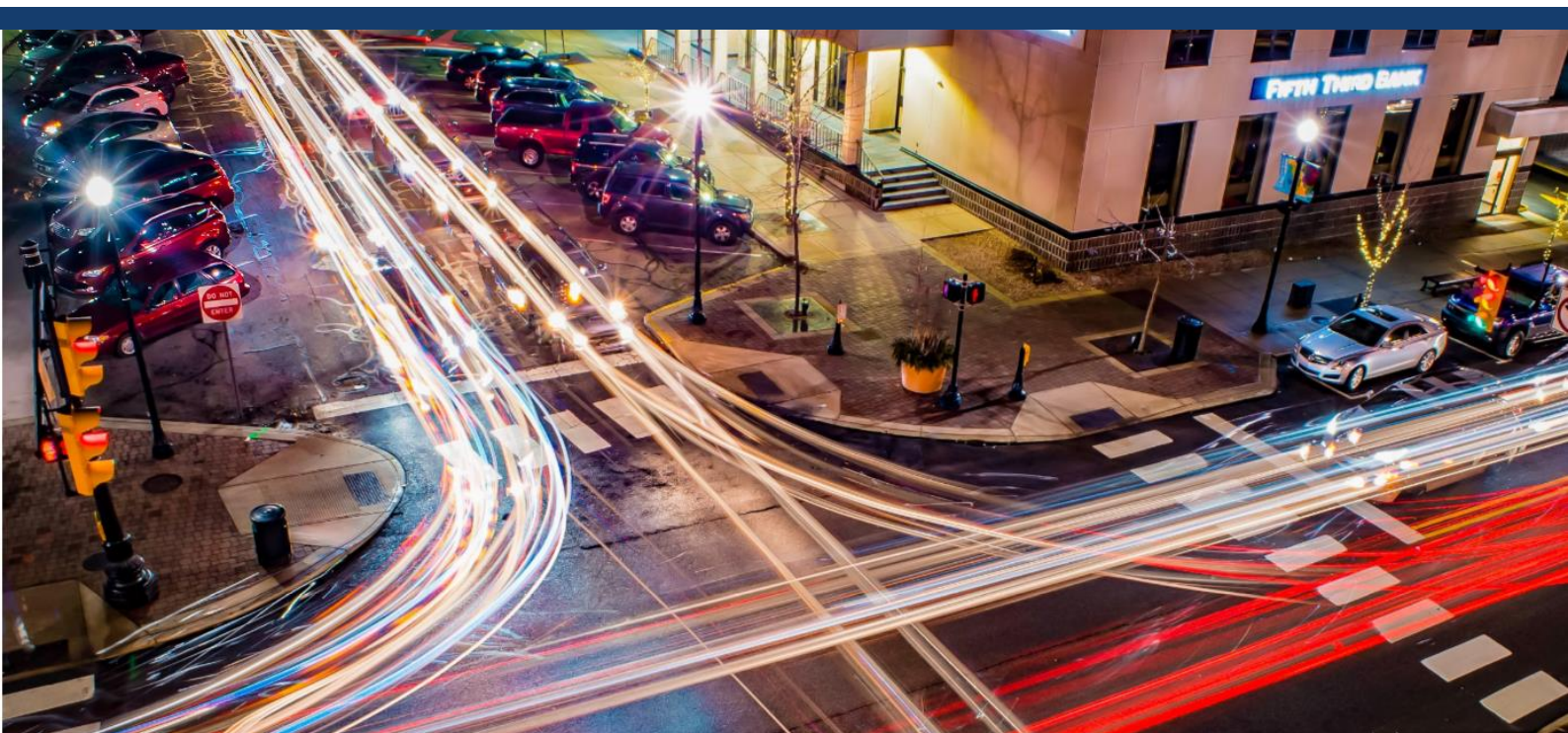
Like image federation, WFMs are capable of extracting clinical history from enterprise EHR or RIS(s) and

presenting the information in a hyper-efficient manner. Radiologists, technologists, or collaborating physicians are equipped with relevant and timely history at the point of care.

Normalized Procedure Descriptions

An IDN with several facilities benefits from the ability to see all their locations and imaging procedures in a normalized manner. Whether the organization is on SNOMED-CT, or moving towards ACR RadLex nomenclature, or has not yet started down this path, WFMs offer a simplified solution of normalizing disparate systems up to an enterprise-

level standard. Each hospital RIS(s) may interchangeably label a “CT Head”, a “CT Brain W/O”, or a “CT Head W/O”. These procedure descriptions will need to be merged into an enterprise standard that gives EI the granularity and control to orchestrate the workflow. Doing this normalization manually creates a significant resource challenge for an IDN that has several RIS(s) or PACS(s) across its enterprise with different billing systems collecting all charges. WFMs can aggregate all disparate RIS descriptions and generate a universal description for orchestrating interpretation and downstream coding, billing, and analytics.



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Workflow Efficiency

The IDN's key drivers for EI strategy are typically to reduce total cost, improve quality, and create efficiency in the workflow. The more equipped dictating radiologists are with automation and effective communication tools with supporting teams/ordering physicians, the more efficient they become with their bulk of daily responsibilities. The additional value of automation is the ability for radiologists to act as consultants with referring physicians and clinical teams. This type of operational environment is becoming paramount in the value-based healthcare operations.

Workflow efficiency has always been limited to the technology offerings and the ability for departments to adopt the features and functionality of technology at hand. WFMs offer several areas of workflow efficient improvements with: single enterprise workflow, automated work balance/distribution, and workflow communication tools, so radiologists can read more and not feel the impact.

Single Enterprise Worklist

One of the sweet spots with any WFM solution is the ability to integrate several source systems such as EHR/EMR(s), RIS(s), PACS(s) into a single portal and workflow. Regardless of the number of vendors or instances, a market available WFM solution will aggregate all DICOM and HL7 messaging into a single access point to enable total awareness of all imaging activities throughout the IDN. This functionality becomes valuable for IDNs, a community hospital partnered with several clinics, or a Radiology group providing services to several entities – seeking to integrate with disparate systems for a unified reading environment.

Sub-specialty reading has become a scarce commodity in the rural areas and organizational leadership is looking for ways to maximize these resources with minimal physical mobility from hospital to hospital. By creating an aggregated reading

environment from all systems, sub-specialty experts can maintain their reading environment in one specific area and provide services across an enterprise or a region irrespective of the location of the patient or interpreting Radiologist.

Automated Work Distribution

WFM platforms have the ability to assign exams to radiologists based upon sub-specialty, relative value unit (RVU), integrated scheduling system, and other criteria. In a busy environment, a Radiologist may be called to perform procedures outside of the reading room or pulled away on a collaboration session or simply consulting a unique case. WFMs are capable of tracking radiologists' activity and assign procedures, as needed. In addition, such criteria as RVUs, credentials, and sub-specialty, will eliminate worklist slot variability for Radiologists.

Workflow Communication Tools

Legacy PACS solutions have been known to alleviate some of the workload by creating automated

workflow tools utilizing proprietary functions with the native database. Certain workflows such as: ED discrepancy, peer review, or Tech-to-Rad communication have been enhancement areas as PACS solutions were implemented. One of the biggest challenges with the creation of an IDN wide EI strategy, is that these notes and workflows are often proprietary and organizations are ultimately left with limited options in the migration process. While the long-term strategy is designed, WFMs offer immediate replacement functionality with similar communication tools that include advanced features with auditing and reporting.



Quality Initiatives

Quality outcome metrics are essential to any EI roadmap as Accountable Care Organizations (ACO) grow and healthcare providers transition away from Fee-For-Volume service model. Traditionally, quality initiatives have been identified as competitive advantage points for healthcare providers - specifically in the boutique markets. Today, hospital leadership is aggressively seeking opportunities to implement quality initiatives and establish benchmarks. To maintain an effective data warehouse, the collection applications or platforms must be well integrated with source systems for analysis and reporting.

WFM applications offer additional out of the box functionality that

organizations can leverage as they begin to develop the analytics and the quality aspects of the their EI strategy.

Critical Test Results Management

In the traditional Critical Test Results Management (CTRM) process, a dictating Radiologist may or may not connect with the ordering physician that needs to be notified of critical findings. In the case that a Radiologist is not successful, the responsibility is typically delegated to support staff that will continue to connect with the physician. A WFM technology can automate the reporting process by connecting via email, text, or phone while documenting the connection attempts for future audits. This type of

technology empowers the idea of quality initiatives by establishing automation, ease of access, and ultimately ensure quality clinical outcomes.

Collaborative Exam Protocolling and Review

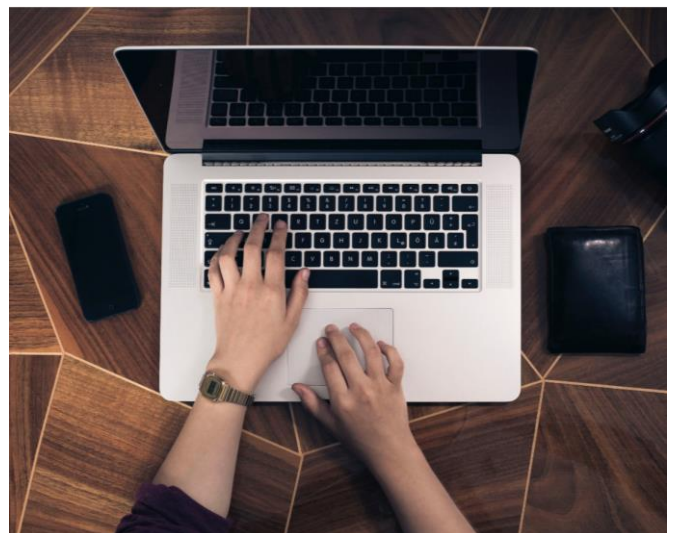
As radiologists slowly move into a more consultative role in the healthcare continuum with distributed reading, collaboration tools will become increasingly essential. WFMs can generate a collaboration workflow and documentation sessions via a web link in the CTRM report. In the case where a follow-up exam is required, referring physicians can use WFM-available web portals to collaborate on an exam protocol with the reading Radiologist that may have marked significant images.

Enterprise Analytics

In the value-based healthcare model, healthcare administration will need to rely on analytics to understand current operations and strategically align their healthcare delivery to benefit from their economies of scale. In addition,

clinical teams and leadership will need to rely on all data that was generated during the patient's assessment and treatment cycles to show who did what, when, and why.

A WFM is equipped to ingest several source systems and aggregate them both before and after procedures are completed. A WFM that can leverage the richness of collected data from multiple systems across the IDN gives end-users the ability to generate analytics that were previously not possible. Most WFMs offer out-of-the-box analytic tools with pre-designed report templates commonly used to run all EI quality reporting needs. This data can be mined by healthcare administrators and clinical teams, as necessary.

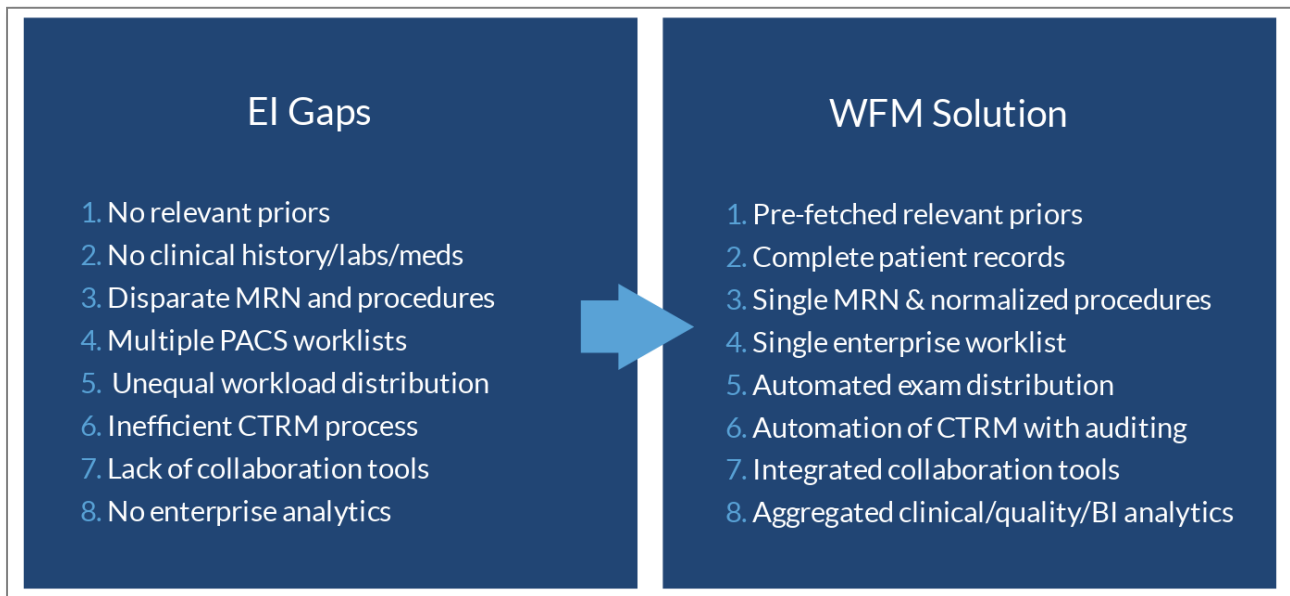


Summary

It is not whether EI initiatives “will” occur within the healthcare organizations, but it is “when” will they occur. Over time, conventional PACS and RIS environments have created silos of patient data and image objects. Provider organizations no longer have the luxury of keeping the data and imaging isolated from the

quality and cost perspectives. Patient records and imaging that are isolated from the governing EHR/EMR will generate major gaps in the patient care continuum and ultimately render the organization helpless with the growing regulatory and reimbursement changes (see Figure 4).

Figure 4: Common EI Gaps and WFM Solutions



Organizations that are undergoing EI planning have difficult decisions to make and having a bridge strategy to simply connect existing systems has

proven to be effective in the early stages. Rapidly consolidating IDNs do not have the financial or resource power to completely replace all

systems, so a phased EI strategy is vital for the long-term objectives to be achieved.

If healthcare leadership is looking to create an EI strategy, then a WFM solution needs to be considered as a viable direction to address immediate gaps today and control and flexibility

for tomorrow's needs. The short-term investment will provide immediate gap-fill and strategically establish a single workflow orchestrator to run the EI services. With several options in the market, EI steering committees are encouraged to review each vendor separately and weigh the offerings against their EI goals.

About the Author



Val Kapitula RT(R), PMP, CIIP, is a Healthcare IT Consultant/Partner at Paragon Consulting Partners (PCP Imaging). He is a highly motivated professional with decades of Healthcare/Health IT experience in clinical system assessments, procurement, implementation, and support. His leadership and clinical experience within Enterprise Imaging has consistently delivered successful results in every Healthcare IT project.

About PCP Imaging

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