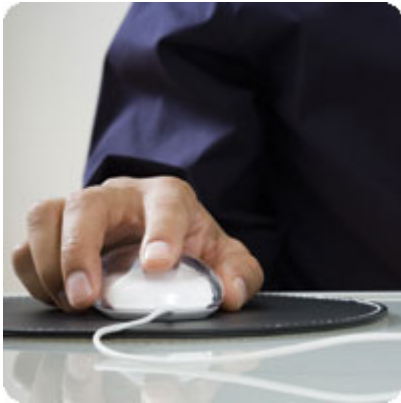


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Enterprise Image Management Delivers

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By Lisa Fratt



Enterprise image management can be a moving target, with every enterprise interpreting the term slightly differently. "Enterprise image management goes beyond PACS to incorporate imaging informatics management include workflow, document management, dictation and RIS in addition to images," offers Ron Cornett, PACS administrator for Radiology Ltd. in Tucson, Ariz. Others tout a PACS-centered view, defining enterprise image management as a single sign-on viewer for referring physicians. Many wrap the "ologies" including radiology, cardiology, radiation oncology and others into a single enterprise archive.

Regardless of the specific definition, enterprise image management carries some complex, unique and variable needs. In some cases, the primary challenges stem from Healthcare Information Protection and Portability Act (HIPPA) and patient confidentiality. In others, technology and integration are the primary barriers. The upside, however, is facilities that successfully navigate the waters of enterprise image management report a number of significant benefits including:

- reduced costs and increased profitability
- improved patient care and safety
- enhanced services to referring physicians
- accelerated diagnosis, report turnaround and treatment.

This month, *Health Imaging & IT* visits with several enterprises to learn more about the challenges and benefits associated with enterprise image management.

The virtual enterprise

Diagnostic Radiology Consultants (DRC) of Chattanooga, Tenn., may be the future of imaging services. The 10-radiologist practice reads more than 200,000 cases annually for 10 diverse practices in Tennessee and Georgia. The enterprise image management approach is fueling growth and enabling expansion into new locations. For example, the state-of-the-art 'dayhawk' practice is negotiating contracts with sites in Florida.

The primary challenge for DRC is that the entities we read for may or may not have a HIPPA relationship with each other, says Director of Informatics James Busch, MD. The practice required a solution that would maintain patient confidentiality across the disparate organizations while allowing DRC radiologists to view the entire patient imaging and report chain across the enterprise without multiple log-ins or passwords. In other words, the radiologist needs access to original x-rays and MRIs acquired at a primary care practice and the follow-up MRI ordered by the affiliated orthopedic group. At the same time, the orthopedic group must be restricted from viewing the prior images and reports unless there is a HIPPA relationship with the initial practice or the patient grants permission. At the same time, each organization requires immediate access to images and reports for its studies.

Two years ago, the need for an enterprise approach led DRC to create Specialty Networks, an IT arm and application service provider. Specialty Networks partnered with Siemens Medical Solutions, and the practice replaced its first generation PACS with syngo Suite including syngo Imaging PACS, syngo Workflow RIS, syngo Voice speech recognition and transcription and NextGen Healthcare Information Systems electronic practice management system. DRC also deployed syngo Suite at facility where it interprets studies. The central syngo architecture segregates images by location and uses a different master index for each site, thus meeting HIPPA and providing legal and appropriate access to each user.

The solution serves as the foundation for an imaging health record, says Busch, and it has delivered critical patient care and practice benefits. For example, the 10 radiologists in the practice offer multiple sub-specialty expertise. "The area ENT surgeons strongly prefer that our ENT specialist interpret their studies. Before syngo, the radiologist had to be at the site where images were acquired to read the images even though they were on PACS because our system did not meet HIPPA patient confidentiality rules. Now, he can read images from anywhere. Surgeons have an immediate response to the most skilled interpretation. Before syngo, they might have to wait up to five days or settle for another reader. The technology truly improves patient care and referring physician satisfaction." Average report turnaround has dropped from 24 hours to less than an hour, and Busch calculates that the practice has saved the equivalent of one radiologist FTE.

What's more, as the practice evolves Busch foresees drastic improvements in patient care because the system allows DRC to centralize radiological images to provide dissemination of subspecialty image interpretation over a broad geographic area. The model enables DRC radiologists to interpret studies acquired anywhere. Using the Specialty Networks system, the practice could target underserved areas like small towns that generate 30,000 to 40,000 studies annually to provide board certified and subspecialty interpretations and therefore improving the quality of radiologic care in the community.

The distributed enterprise

Radiology Ltd. is a 45-radiologist practice that operates 11 imaging centers in southern Arizona. Workflow management is essential to the success and profitability of the practice, says Cornett. Radiology Ltd. relies on AMICAS' Vision Series PACS to centralize and manage workflow processes.

"Vision Series incorporates XML-based (Extensible Markup Language) integration that allows us to integrate PACS with dictation and document management," explains Cornett. RealTime Worklist provides the PACS administrator with tools to build efficient workflow. For example, Radiology Ltd. bypasses hanging protocols; instead Cornett defines image flow for the practice's 135 imaging systems. Images typically move from the acquisition device to QC, where techs complete image prep tasks like hanging, windowing, leveling, magnifying and pushing to 3D. "Our radiologists interact with the software as little as possible. This translates into a 35 percent increase in efficiency," states Cornett.

The software also facilitates a virtual team. For example, four neuroradiologists at four separate centers read from a common master neuro list. "If one team falls behind, it can send out a page. Three or four radiologists jump on their list, often moving through 60 or so cases in 30 to 40 minutes," says Cornett.

"Using PACS to drive workflow is key to efficiency," sums Cornett. The PACS administrator admits the approach presents a few challenges. It's relatively easy to get the software to do what we need, says Cornett. The glitches stem from other areas. For example, the PACS and RIS must remain synced, which requires a fair amount of integration. Human resources can take some tinkering, too. "Training users at 12 different sites to do everything the same way is a logistical challenge," admits Cornett.

The single repository

Barnes Jewish-Christian Healthcare (BJC) of St. Louis, Mo., is one of the largest non-profit healthcare

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delivery organizations in the country. It includes 13 hospitals and multiple offsite clinics, completes 1.6 million imaging studies annually and serves thousands of referring physicians. The organization does not have a single image management vendor; each site has a unique PACS, and several operate more than one PACS. Barnes Hospital, for example, relies on ScImage's PICOMEnterprise as its cardiology PACS and Siemens syngo Imaging for radiology image management, and it houses several other archiving systems for modalities such as ultrasound and digital mammography.

The goal at BJC seems simple, says Keith Skaer, manager of imaging informatics. "We wanted to provide a single viewer for all images regardless of where they were acquired. This model eliminates multiple log-ins for referring physicians." The system deployed a back-end repository for its multi-vendor PACS. Images are sent from the modality to a short-term archive at the local facility and then to the long-term repository for referring physician viewing and disaster recovery.

Vendors interpret DICOM differently, which presented a challenge to the approach. "Not all PACS are able to query and retrieve from a third-party archive," explains Skaer. "We have to work with each PACS vendor and the third-party archive provider to develop the processes to query/retrieve from the third-party archive."

Despite the technical hurdles, the system has met its goal. The benefits are significant. Despite running more than a dozen disparate PACS, BJC provides referring physicians one location for viewing images. The approach provides a standard format for the entire medical record including images, presenting referring physicians with a consistent view regardless of where images were acquired. Users do not need to learn to operate multiple PACS, which improves referring physician workflow and satisfaction.

Johns Hopkins Medical Institutions in Baltimore, Md., also transitioned to an enterprise approach in the last year, implementing Emageon's Enterprise Visual Medical System as its unified medical imaging archive tightly coupled with an electronic medical record for radiology, cardiology, radiation oncology and dermatology.

The enterprise approach brings significant economic advantages, says James Philbin, director of information technology, by providing economies of scale. For example, the approach minimizes the number of PACS administrators, enabling the enterprise to concentrate expertise and trim costs. Individual departments realize other benefits. The IT department provides and manages lifetime storage for those tricky non-DICOM modalities. At the same time, departments can hold onto mini-PACS that are connected to the Emageon archive. And referring physicians need not learn to navigate multiple separate systems. Instead, they rely on the single Emageon interface. Johns Hopkins enterprise approach also incorporates a fully replicated archive and data center, which virtually ensures fail-safe system. In the end, however, patient care is the driver. "The real value of enterprise image management is the patient care benefits that come from a unified imaging record with a robust replicated system with 99.9 percent uptime," sums Philbin.

The unified enterprise

Rockwood Clinic in Spokane, Wash., is a 23-site, multi-specialty practice serving patients in Washington and Idaho. Four years ago, the clinic decided to invest in an enterprise PACS and RIS. "Our goal," explains JoAnn Tarlton, director of radiology, "was to enable provide access to images and reports in the department, outlying clinics and outside of our intranet to referring physicians through a web-based product." As Tarlton and her colleagues scoured the marketplace, they realized that 90 to 95 percent of RIS functions, including patient reports and CPT coding, are incorporated in PACS. "Usually, the only missing piece is scheduling," reports Tarlton.

Rockwood Clinic decided to deploy DR Systems Dominator PACS and implement a separate scheduling module. Tarlton estimates the decision to bypass a stand-alone RIS saved the clinic approximately \$750,000.

Although a cost-effective solution can support success, a robust solution and responsive vendor are

essential. "We found DR Systems to be very responsive to user needs; the company often incorporates user group input into its next software release," notes Tarlton. For example, after users voiced concerns about image loading, the company made it possible to autoloading images and provide immediate availability. Shortly after Rockwood Clinic deployed Dominator, DR Systems purchased rights to scheduling software and integrated the new component. The upgrade enabled improved scheduling and electronic billing at Rockwood Clinic.

The system has served the clinic well and will continue to meet its needs into the future, says Tarlton. Items on the enterprise agenda include cardiac cath lab image archiving, a PET-CT interface and a 64-bit processor. "We're functioning well without the 64-bit processor, but it will help improve processing speed when it comes to large datasets such as digital mammography images," explains Tarlton.

Insider advice

Busch says, "Start with an assessment of needs across the enterprise, and determine goals for the level of service." The next step is evaluating the technology. "I highly recommend a site visit to determine the accuracy of the sales pitch," continues Busch. "Get a list of customers and make sure that the system does what the vendor claims," adds Tarlton. Some key technical points include the abilities to transfer images from a legacy PACS to the new system, query and retrieve from a third-party archive and HL7 interfacing. Storage costs are key, too. "Select your storage carefully," says Philbin. Johns Hopkins relies on NAS storage because it is simpler to manage than SAN, making it less expensive overall.

Transitioning to an enterprise approach does take time, commitment and training, but the investment pays. Enterprise sites are able to create economies of scale, streamline and improve image management and workflow, better serve internal departments and referring physicians and enhance patient care. Finally, sites that have taken the enterprise approach are securely prepped for the future with a solid foundation for non-DICOM image management and an image-enabled EMR.