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PROVIDERS ILLUMINATE PACS ENTERPRISEWIDE



Organizations use various strategies to share electronic clinical images with all types of caregivers.

By Beckie Kelly Schuerenberg
Senior Editor

Three years ago, executives at **Mercy Health Partners** decided to reevaluate how the seven-hospital delivery system manages clinical images. Images were playing a larger role in patient care, so executives wanted all types of images, including those from cardiology and pathology, to be integrated into a single system so they could be available to all locations.

To do so, **Mercy Health Partners** planned to install a picture archiving and communication system at three rural Ohio hospitals to enable those facilities to share images with Mercy's four Toledo-area hospitals.

But enabling enterprise-wide access to images required more than a shift in strategy. The delivery system had to increase the bandwidth to its rural facilities to 15 megabits per second from 6 Mbps to enable large image files to be transmitted quickly.

Mercy Health Partners also purchased an enterprise information management system to create a separate centralized storage area network for the delivery system's PACS and customize all images for viewing. Both systems are from Rochester, N.Y.-based **Carestream Health, Inc.** (formerly **Eastman Kodak Co.**, which sold the health division to Toronto-based Onex Corp. under a deal that closed May 1, 2007).

The delivery system also required physicians to use authentication tokens from RSA Security Inc., Bedford, Mass., to access the PACS.

"We wanted our rural locations to have a broader reach to images," says Jim Albin, CIO. "But that also included images that weren't included in the PACS, such as cardiology and pathology images."

Enterprise-wide clinical imaging has become a strategic

FEATURE

priority for many hospitals and group practices. Physicians of all stripes are the drivers of the strategy, because they increasingly are relying on clinical images to devise treatment regimens. Enterprise image access also is part of the movement toward centralized information access, industry experts say. Many facilities, for example, already offer centralized access for lab, medication and other clinical data and want to do the same for images.

But as **Mercy Health Partners** discovered, various technological and workflow issues must be addressed before images can be made available enterprisewide.

In addition to evaluating network bandwidth, storage and security, provider organizations also must ensure each clinician can view an image at the resolution they need for their specialty of care, says Gary Reed, president at Integration Resources Inc., a Lebanon, N.J.-based imaging consulting firm.

Also, an enterprisewide clinical imaging strategy often requires providers to integrate a PACS with other clinical software, such as a laboratory, radiology or hospital information systems, so physicians can access various types of patient data with images, he adds. Further, offering all physicians access to a PACS means they must be trained to use the system as well as kept abreast of future enhancements.

"The role of the medical image has gone well beyond the radiology department. It now serves the entire hospital and wide area community," Reed says. "But hospitals need a realis-

tic implementation strategy to make sure they have the human resources and infrastructure in place to support this use. They shouldn't take on too much too fast."



“Patients move between hospitals, so we needed an infrastructure that enables physicians at one hospital to access images from another.” **Jim Albin**

Three years after **Mercy Health Partners** began its enterprisewide clinical imaging initiative, it's just beginning to see returns. So far, its four Toledo hospitals are connected to the PACS storage area network, which was jointly developed by **Carestream Health** and EMC Corp., Hopkinton, Mass. Mercy expects to have one rural hospital on board this month, with the others going live by the fall, says Albin, the CIO.

When an electronic image is created, one copy is stored on the local hospital's PACS, and the enterprise image management system sends two copies over the delivery system's network to the SAN at Mercy's flagship St. Vincent Mercy Medical Center.

When physicians log into the PACS—

either from the network or via a portal—the image management system retrieves their requested images from the SAN.

Mercy Health Partners, however, still has some issues to resolve regarding its enterprisewide clinical imaging strategy. For example, it must decide how long images will be retained in the SAN and at what resolution. These and other best practices will be decided by the delivery system's clinical systems committee, which comprises its chief medical officer and other medical staff, Albin says.

Additionally, Mercy plans to integrate its cardiology imaging system, from McKesson Corp., San Francisco, with the PACS SAN so physicians can access images from this software via a single application. It also plans to purchase a pathology image system and integrate it with the SAN.

"Patients move around between our hospitals, so we needed an infrastructure that enables physicians at one hospital to access images from another," Albin says. "Now they don't have to make a trip to the medical records department or film room to see them."

With all the planning that often goes into an enterprisewide clinical imaging initiative, it's common for organizations to take three or more years to achieve their goal.

While that may seem like an eternity to physicians, the incremental benefits can help to decrease any impatience.

Laguna Niguel, Calif.-based West Coast Radiology Centers took five years to enable access to images across its

three locations. But the lengthy project provided enough time for physicians to become comfortable with using electronic images and for the radiology practice to create a substantial image archive before it implemented a PACS enterprisewide, says Tim Chavez, executive director.

In 2003, the vendor of its newly installed radiology information system was acquired by Milwaukee-based Merge Healthcare, which already marketed a PACS. So West Coast Radiology decided to wait until Merge Healthcare tightly integrated the RIS with the PACS.

However, West Coast Radiology didn't shut down the enterprise imaging initiative while it waited. It purchased the RADWorks software from Waukesha, Wis.-based GE Healthcare to start distributing electronic images across its main location in Mission Viejo.

It configured the read-only application to send images to a centralized server and distribute them to various workstations across the facility. The interim step enabled physicians to become accustomed to using electronic images before the practice implemented a full-blown PACS.

The practice also worked with Techstrata LLC, a Costa Mesa, Calif.-based consulting firm, to upgrade its network to support its plans for an enterprisewide PACS. Besides increasing bandwidth, the practice implemented mirrored servers to facilitate image storage at multiple locations.

For example, when an image is created

at its Mission Viejo facility, it's stored on a local server, but also copied and sent via a T3 line connection to a server at its Santa Ana location. West Coast Radiology also makes a hard copy of each image and sends it to an off-site data storage facility.

Additionally, the practice implemented an off-the-shelf virtual private network application so physicians could access images from their homes.

By the time the practice finally purchased the PACS, West Coast Radiology's physicians already knew the processes for exchanging images, and the network was robust enough to support image transfers, Chavez says.

In addition, waiting for the PACS had other benefits: The application by that time had been tightly integrated with the practice's RIS as well as digital dictation and document management applications used by transcriptionists, he adds.

"Once we adopted the PACS, we could immediately enable it to be used on our wide area network," Chavez says. "And because it was fully integrated with the RIS and dictation system, it's enabled our radiologists to capture data no matter where they are."

Seeing the light

West Coast Radiology also has developed a Web portal that enables referring physicians to log into its PACS to view images and patient information. The inclusion of referring physicians in an enterprisewide clinical imaging strategy is becoming more common

because it has proven to be an effective marketing tool that helps drum up more business, says Reed, the consultant.

But enabling outside access can create another set of challenges, says Todd Frech, senior partner at Ocius Medical Informatics, a Ravenel, S.C.-based consulting firm. For example, an organization must reevaluate its network's bandwidth and security before bringing on so many new users. It also should decide how to ensure referring physicians are appropriately accessing the images, he adds.

"It's attractive for imaging centers to offer a portal for images because it can get referring physicians the information they need without requiring them to have a large I.T. department," Frech says. "But it's the imaging center's responsibility to ensure their back-end systems are secure and monitor who's looking at what."

Tristan Associates executives faced these challenges in 2005 when they wanted to offer referring physicians access to the organization's new PACS, from AMICAS Inc., Boston, as part of an enterprisewide clinical imaging strategy. The Harrisburg, Pa.-based radiology practice had just completed a number of I.T. enhancements to enable image sharing among its six facilities, including upgrading to a 100 MB backbone at its four main offices, which are connected to its remaining two offices via T1 lines.

But executives pushed to make the investments and upgrades required to include referring physicians because as



FEATURE

an early PACS adopter in the central Pennsylvania area, they wanted to help educate others on the benefits of electronic imaging, says Brian Bloom, M.D., a partner at the practice.

To offer secure access for referring physicians, the practice connected the imaging application's Web portal to a separate, dedicated server that resides outside its network. Tristan's main PACS server makes two copies of each image and forwards one to the referring physician server. The standalone server encrypts the images as they are sent via the portal.

"We decided to go this route to keep referring physician access isolated from our network," Bloom says. "It hasn't affected our access to images because the server used by referring

physicians is isolated from our main PACS."

Tristan Associates requires referring physicians to register to use the Web portal. The registration enables referring physicians to create a secure log-in to access images for only their patients and create a set of preferences. For example, they can select the resolution for images or request that images be copied to a CD.

Last year Tristan Associates installed a module to its PACS that automatically e-mails referring physicians a link to their patient images in the Web portal when they are ready for viewing. Now after physicians log in, they are presented with a list of their patients and their results. The Vision Reach application, from AMICAS, can be customized

so referring physicians see information for all their patients or just the ones for whom they recently ordered a test. Prior to installing the module, physicians were notified by fax when images were available, and once they logged onto the site they had to enter the patient's name and medical record number.

"Referring physicians immediately appreciate the impact this system has on their workflow and need for immediate communication of results," he says. "It also has an impact on their practice's front office staff because they no longer have to manage faxed reports or film. Using this system to give referring physicians better access to images has proven to be a significant differentiator in our marketplace." •



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