Is Your Infrastructure Ready for Digital Mammography?

BY STEPHEN ARCHER

It's not just about "the box."

CR-based mammography systems will bring digital mammography within reach of many U.S. imaging centers and other breast imaging facilities. However, just buying the capture device or "box" may not achieve all the results facilities desire. The most compelling benefits of digital imaging are related to gaining a more efficient workflow, starting with digital image capture but certainly not ending there.

Achieving the full potential of digital mammography requires attention to the entire imaging chain – from digital image capture to viewing, distribution, storage, and management.

As imaging center managers evaluate their infrastructure, they need to recognize that the average file size of one screening mammography procedure with a high resolution CR system may be as high as 200 megabytes. (The actual size depends upon the mammography system selected). An imaging center with 20 screenings a day needs to plan to manage up to 4,000 megabytes (4 gigabytes) of new images a day. It may be possible to use lossless compression to reduce these file sizes to one-half or one-third of their original size, but the file sizes still remain very large. A digital review of prior screening exams doubles the volume of data that will need to be handled on a daily basis.

With this in mind, here are some key factors to consider when equipping your infrastructure to support and maximize a new digital workflow:

Managing Patient and Image Information

On-line patient data from a RIS system is an essential part of an efficient digital workflow that may also include PACS for image management and storage. In addition to providing patient identification and exam information, the RIS can automate mammography-specific activities including sending reminder letters for annual exams, producing customizable patient letters for screening and diagnostic exams, and other functions. Working with the RIS, the PACS can facilitate the flow of images through the organization, from viewing to reporting, storage, and disaster recovery/backup. Since both RIS and PACS are integral to an efficient workflow, facilities may want to install these systems prior to installing digital mammography equipment or make it part of a digital conversion.

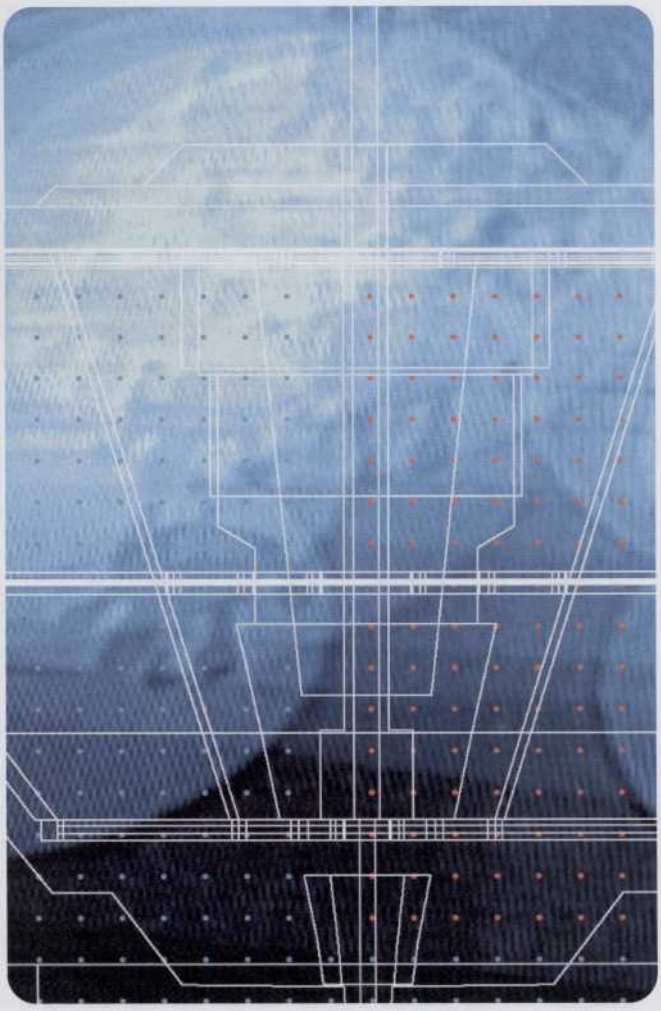

Image Viewing

Since most general radiology PACS systems do not use five megapixel monitors that are generally required for mammography, facilities with PACS may need to consider installing new workstations. These workstations should also support special tools for displaying mammographic images.

Imaging centers that perform both diagnostic and screening exams will want to consider multi-modality breast imaging workstations that allow radiologists to review all digital mammography exams as well as MR, ultrasound, and other general radiography exams. These workstations are much more productive and cost effective than installing dedicated workstations.

Network Bandwidth

Due to the size of digital mammograms, imaging center managers need to ensure they have computer networks that can support the transmission of these large image files.

Is your facility's network up to the challenge? Getting the answer usually requires the services of your internal IT staff or a network specialist supplied by a contracted vendor. The important thing is to have an appropriate IT person evaluate your existing networking infrastructure and environment and find out what (if any) actions are required to deliver acceptable image distribution speeds. You don't want radiologists complaining that it takes longer to receive an exam for review on soft copy than it did with film.

Image Storage

A center with 20 screening exams a day will generate about 1 terabyte of mammography images each year. Even with no growth in procedures, this requires seven terabytes of image storage over seven years (a common storage requirement). Most center managers will want to factor in an appropriate percentage of growth when calculating anticipated storage needs for the immediate future. Facilities that conduct diagnostic breast exams should include appropriate storage for those exams in those calculations.

It's easy to see that implementing digital mammography systems may spur imaging centers to expand storage devices earlier than planned. Some center managers may choose to outsource this image storage to a hosted image management vendor with retrieval on demand. This makes the third party responsible for maintaining, backing-up and retrieving prior exams, and allows imaging center staffs to concentrate on their core business of attracting and serving new patients and their physicians.

Disaster Recovery

Mammography exams must be stored for many years, and facilities must also plan for off-site storage and back-up to cover disasters. Providers with existing business continuity/disaster recovery plans can simply add mammographic images, but facilities without these plans will need to develop and implement one. Imaging centers may call upon a hosted information management vendor to help develop and implement a business continuity strategy.

Printing

While printing is unlikely to be the primary storage or viewing method, facilities will need a high-resolution, mammography-capable laser printer to share images with referring physicians, surgeons, or patients who want a second opinion. Output of mammography images requires a high-resolution printer. Imaging center managers should check to see if they can upgrade existing printers to handle mammography images as well.

DESIGNING EFFICIENCY INTO THE WORKFLOW

Implementing a digital mammography workflow is a demanding task that can exceed the IT resources of even large imaging center chains. Therefore many imaging center managers may want to involve vendors or other third party resources to help them design and implement a supporting infrastructure.

Mammography consultants often recommend retaining a project manager with the expertise required to handle the purchase and/or integration of all the necessary networking, information, and management systems. These consultants also recommend a complete workflow redesign so that facilities can optimize the benefits of a new digital workflow and not be hampered by outdated tasks and routines.

Experienced professional services teams can work with imaging center managers to optimize scheduling, exam execution, and reporting. These professionals can help maximize the productivity of a digital workflow, or develop a business case to evaluate implementation of digital mammography technology (and determine whether CR or DR is the most appropriate).

ADJUSTING YOUR FOCUS

Many mammography providers are currently focused on evaluating the technical specifications of digital mammography systems and calculating a return on investment for their facility.

It's less obvious – but equally essential – that managers spend an equal amount of time developing an environment and infrastructure that can support efficient digital mammography operations. A digital workflow not only offers greater staff productivity and patient care benefits, it also enables efficient electronic delivery of images and reports to referring physicians.

As with general radiography, installing a CR-to-print or FFDM-to-print solution offers very limited benefits since it does not address the need to integrate these images into a digital workflow that includes automated input of patient and exam information, as well as fully featured soft copy viewing, and efficient image storage, distribution, and backup.

To learn more about author Stephen Archer, see our Contributors section on page 5.

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