



Technology Trends: Is your breast imaging center ready to perform same-day follow-up?

By Mark Palacio [\(0\) Comment](#) | [\(0\) Like](#)



Economic turbulence has dashed the hopes of many businesses on the shoals. Most economists are in agreement that the best way to navigate the storm is to batten down the hatches by running lean and by protecting the existing customer base. That means offering exceptional customer service and more value at each encounter. In imaging departments, shrinking reimbursement was already forcing radiology to reevaluate its role as a profit center. Women's health service line offerings have been recognized as a way to bolster the return on imaging investments but with a down market, screening mammography services may not be enough. An emerging differentiator in women's health programs is the ability to offer same-day breast screening follow-up. While it is possible to deliver this level of exceptional customer service, how much does it cost to implement?

High-volume workflow

The same-day follow-up paradigm hinges on two components: using digital technology and employing highly trained, efficient technologists.

In Boca Raton, FL, one high-volume breast center is using both components in a symphony of efficient operation played to the tune of approximately 90,000 billable procedures in 2008 -a record high for the center. The Center for Breast Care, part of 400-bed Boca Raton Community Hospital, operates 4 digital mammography units, a stereotactic biopsy table, an ultrasound biopsy unit, 2 breast ultrasound systems, an automated breast ultrasound device, a dedicated breast magnetic resonance imaging (MRI) system, computer aided diagnosis (CAD) systems, bone density and a positron emission mammography (PEM) system.

The outlook was not always so positive for the Center for Breast Care. About 3 years ago, an inefficient workflow and tremendous delays in report delivery meant that the

mammography units were booked out for 5 months and patients typically had to wait 6 weeks for screening, according to Kathy Schilling, MD, medical director of breast imaging and intervention.

The center's workflow was in need of an overhaul and it began by addressing staffing issues in the mammography rooms. The goal was to screen a woman every 15 minutes in each of the 4 mammography rooms. Leveraging digital-radiography (DR) based digital mammography systems allowed the center to meet this high-volume target. Compared with cassette-based computed radiography (CR) mammography systems, the direct digital acquisition on DR units allowed for tremendously high throughput. However, digital technology alone was not enough to handle the volume and the center now staffs 2 radiologic technologists per screening mammography room to compensate.

The center also employs 8 radiologists exclusively dedicated to mammography reading. They also scan all prior images to speed up the workflow. Other workflow enhancing features are having a universal reading workstation and using CAD software to keep the radiologists focused. After screening mammograms are completed, the technologist leads the woman to a waiting room and interacts directly with the radiologist reading the case. The radiologist indicates either that the patient can leave or that additional follow-up is needed. Women can receive additional spot magnification or ultrasound on the same day and a staff of on-site nurse practitioners allows for women to schedule follow-up MRI or nuclear medicine imaging that day.

"These women are the ones who direct their family's healthcare," said Dr. Schilling.

"When that satisfied patient has a husband who needs to come in for a colonoscopy, we hope that means that they will choose Boca Raton Community Hospital."

Expert mammography techs

The Center for Breast Care operates at a high volume and can justify the overhead required to run an operation of that magnitude. In Brookhaven, MS, the staff at 110-bed King's Daughter Medical Center does about 11 screening mammograms on an analog mammography unit. They are looking at ways to offer high-touch care at a lower cost. The solution they have devised, but not yet implemented, calls for an expert mammography technologist to triage suspicious cases for the radiologists and to provide follow-up scanning with spot magnification, ultrasound or breast-specific gamma imaging (BSGI).

"From a customer service perspective, it's a beautiful model," said Jim Krichbaum, RT(R), director of radiology at King's Daughter Medical Center. "However, the idea of relying on an expert mammography technologist is a subject of discussion within my peer group of radiology managers. Our senior mammography technologist has 30 years of experience. She could call out suspicious areas for the radiologist's attention, and I think many radiologists recognize the value in that model."

With the BSGI camera, King's Daughter has a potential third level of same-day follow-

up services that can provide a 98% rate of confirming the presence of malignant breast cancer, according to Krichbaum.

After the initial mammogram, an ultrasound could determine whether the lesion is solid or cystic and, in most cases, a subsequent BSGI scan could be ordered and performed on the same day. The camera uses a technetium-99 radiotracer, which Krichbaum says is always in abundant supply at King's Daughter. Taking into account that the BSGI camera confers a significant amount of diagnostic confidence at a lower price tag than MRI, smaller facilities like King's Daughter can potentially use these devices in conjunction with expert mammography technologists to provide faster and more definitive diagnoses for their patients.

In this highly competitive climate, delivering same-day follow-up could help healthcare providers increase referrals while improving the care of women in their communities.

LCD Monitor Trends

Digital acquisition is the key to optimizing a breast imaging workflow. As the move to digital continues, image review is now being done primarily on 5 megapixel (MP) monitors. In the past, cathode ray tube (CRT) displays were the only U.S. Food and Drug Administration approved way to read digital mammography. Recently 5 MP grayscale liquid crystal display (LCD) monitors have been supplanting their larger CRT brethren as the platform of choice for digital reading. But as the market evolves it is becoming increasingly more difficult to choose which display has the best features.

Vendors compete on factors like display brightness, viewing angle, shades of gray, calibration software and many other areas. One often-overlooked area is the graphics card that drives the LCD display.

"To improve the productivity, radiologists need to have the images on screen as fast as possible and they need to read as many as possible every day," said Hideyuki Honda, marketing manager for North America at Eizo Nanao Technologies Inc., Cypress, CA. "They need a powerful graphics card to do that because the mammography image is very large. Having more memory on the graphics card enables images to appear faster."

When purchasing a 5 MP display, manufacturers offer either proprietary graphics cards or the ability to work with third-party graphics card manufacturers. Third-party integration allows users to realize a lower price point. Proprietary graphics cards offer the benefit of being completely optimized for medical-grade display and review. As technology continues to advance however, third-party cards are becoming more competitive with the technical features of proprietary cards.

The evolution of digital mammography displays

The next step in digital mammography viewing could be trading in a dual-head 5 megapixel (MP) setup for a single 10 MP widescreen monitor. This configuration has obvious advantages, since there would be only 1 calibrated brightness across the entire

monitor. Further, with 1 large-format monitor, there is more on-screen "real estate" compared with 2 LCDs. However, reading on a widescreen monitor could pose significant challenges for radiologists.

With the wider format, it is unclear how much diagnostic information will be viewable in the far corners of such a screen. In this case, factors like off-angle viewing would play a significant role in clinical acceptance of the device. Currently, there is not a significant difference in viewing angle among most of today's 5 MP LCD offerings (Table 1).

Discernable differences exist in factors like peak luminance and backlight life. For instance, peak luminance, which is measured in cd/m^2 , must be $\geq 400 \text{ cd/m}^2$ for diagnostic mammography. While many monitors can be calibrated higher than 400 cd/m^2 , the tradeoff is usually decreased backlight life. Backlight life reported in Table 1 is typically the number of hours to 50% luminance.

Even though 10 MP offerings may be technically superior to 5 MP displays, there is still a possibility that the technology never sees the light of day.

"The 16 MP monitor that was introduced to the market years ago ultimately failed because it was not possible to produce," said industry veteran Albert Xthona, product manager, digital mammography, BARCO, Kortrijk, Belgium. "Similarly, the 10 MP configuration may reach clinical adoption but it is a little early to say if it will become the clinical standard."

"[The major drawback to having one 10 MP monitor is that] the entire workstation will be down in the event of a hardware failure." said Hideyuki Honda, marketing manager for North America at Eizo Nanao Technologies Inc., Cypress, CA. "With a dual-head setup, you can continue your work on one monitor if it is an urgent read."

Ultimately, the decision to purchase a 5 MP display will be driven by many factors, and sometimes the decision is made as part of an overall mammography workstation package. In today's economy, it would be prudent to spend extra time scrutinizing the features of LCD displays to ensure that radiologists are reading on a monitor that satisfies their needs.

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