

SPECIAL SECTION: OPTIMIZING PACS

The Workspace of the Future:

Making Breast Imaging Work Flow

By Mary C. Tierney, MS

PACS is powering better workflow in breast imaging, transforming the way breast imaging radiologists read studies and interact with one another by improving physician efficiency, accuracy and saving time. Metrics matter in healthcare today and now excellent efficiency, productivity, quality of care and provider and patient satisfaction are measures of success that belong together in the pursuit of better breast imaging.



It was similar forces and frustrations that motivated teams at the Hospital of the University of Pennsylvania (HUP) and Penn Medicine in Philadelphia, along with Northwestern Memorial Hospital in Chicago, to seek out a single PACS workstation to read their complete portfolio of breast images.

HUP is the flagship hospital of the University of Pennsylvania Health System with 776 beds. Penn Medicine consists of the Raymond and Ruth Perelman School of Medicine at the University of Pennsylvania, and the University of Pennsylvania Health System. Penn Medicine hospitals are ranked in the Top 10 in the nation and No. 1 in Philadelphia by *US News and World Report*.

Located in downtown Chicago, Northwestern Memorial Hospital is the flagship 894-bed academic medical center and primary teaching affiliate for the Northwestern University Feinberg School of Medicine. Northwestern ranks 13th in the

nation and No. 1 in Chicago by *US News and World Report*.

HUP and Northwestern are both busy academic practices that handle system-wide screening exams, high-risk screenings, complex referrals and second opinions. Their workflow challenges were similar to those faced by many breast imaging programs in which the need exists to read tomosynthesis studies alongside breast MRI, ultrasound and prior images via an EMR. Penn needed to more efficiently view and manage the large datasets generated by tomosynthesis studies, which all patients receive.

The team at Northwestern was tired of viewing tomo images on separate and all-too-often unavailable workstations. They also shared a concern that their accuracy was compromised as they logged onto multiple systems and tried to mentally analyze points of interest. Efficiency in interpretation was a goal as well.

Their choice was Sectra PACS, which both selection teams liked for the agility at bringing images, reports and data to end-users' fingertips on one workstation. Penn's breast imaging team is using PACS deployed across the health system, while Northwestern chose dedicated breast imaging PACS that rides alongside a radiology PACS.

Data-driven Reads

For both teams, the benefits of reading on one workstation were apparent immediately. "We didn't always realize what priors, especially cross-sectional imaging, might be helpful until we could see all the studies listed together," says Emily Conant, MD, chief, division of breast imaging at HUP. "Suddenly we could seek out any prior the patient had through our [Epic] EMR, such as CTs and PET scans to look at areas in the



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breast or axillae. No more dashing back and forth [between workstations] and hoping we were remembering all the image details. It's now easier to dive into the patient's image sources for the most thorough care."

Conant cites the example of a female patient with enlarged lymph nodes. "It's amazing how often we see a case where the lymph nodes look a little big or, we're seeing them for the first time and we're not sure if they were previously there or not," she says. "It's great to be able to look beyond the breast and look at a chest CT, to confidently say 'no, they were there two years ago and are stable.' That was much more difficult with multiple workstations."

Being able to read tomo images from any vendor on a PACS workstation along with the full spectrum of breast images was the goal of Sarah Friedewald, division chief of breast and women's imaging at Northwestern Memorial Hospital and medical director of the Lynn Sage Comprehensive Breast Center in Chicago. Prior to Sectra PACS, her department used paper signup sheets for radiologists to reserve four-hour reading blocks. Frequently, in the middle of reading cases, another radiologist would ask to use the only tomo review station for an urgent diagnostic read. "It was beyond frustrating," she recalls, "and were we a bit burnt out? Yes."

They weren't alone. Radiology now ranks seventh among medical specialties whose practitioners report burnout, with 45 percent of rads doing so, according to Medscape's 2018 National Physician Burnout and Depression Report. Meanwhile an earlier Rand study by Friedberg et al. showed physicians derive most of their job satisfaction from their time providing quality care to patients.

1 Workstation, Many Benefits

Reading from one workstation brings greater confidence in the quality of their care, Conant and Friedewald note, having seen improvements in physician confidence and efficiency as they look across all modalities on one workstation without having to move their eyes far. Decision-making is more comprehensive and swift. As Conant sees it, "We've always done the most comprehensive evaluations of patients with the information we have, but now we have *all* the information we need in one place. A single workstation with multiple modalities at your fingertips is definitely more efficient

as we have more and more data. With greater efficiency comes greater accuracy.”

At Northwestern, PACS workstations for each radiologist have brought greater productivity and peace of mind. “It is as simple as clicking on the patient’s name. All the images come up and you can evaluate them in one space without impacting anyone else’s workday,” Friedewald says. “When we need images from outside of breast imaging, IT sends a link from our VNA and we ingest them into our PACS so they are part of the patient’s record.”

Friedewald also appreciates the uncluttered patient jacket. Worklists can be standardized to populate and prefetch cases or customized by radiologist depending on preference. She calls the customizable worklists a “phenomenal” organizational tool, since they do away with piles of requisitions she used to need to dictate a case. “Now I can assign it to myself,” she says, “and it’s in my folder so I know to do it. Maybe I need to check pathology or some other issue. No more paper.”

Hanging protocols display all the breast images, allowing physicians to toggle among different modalities, such as a tomo and a 2D image, “an important piece because I can keep my eye gaze in the same location,” she says. “It offers a more complete view that improves my confidence in what I am seeing in the image.”

It also saves time. “And on top of that, it’s good patient care,” Friedewald says. “You’re setting yourself up for error when you move among different workstations and are focused on diagnosing one patient.”

Conant agrees. “The more time we spend looking for images, the more accuracy could suffer,” she adds.



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“Sitting in one place with one view improves efficiency and accuracy for sure, and that’s good for everyone.”

Happy Docs, Better-served Patients

The improvements don’t end there. Physicians and trainees at both institutions are using PACS-integrated instant messaging, for example, and they’re using the cross-modality navigation tools to ensure continuity of care in accord with Medicare’s Quality Payment Program.

“What seemed frivolous is a key tool we use constantly,” Friedewald says, noting they can communicate via instant messaging about corrections to reports and link to the image. The physicians click a button, find the patient and insert the link.

Everything is ready for the trainee next time they log on. The physicians in different locations also rely on instant messaging to immediately confer on cases by sending quick links.

Tight integration of all the modalities, breast imaging PACS and navigational tools comes in handy, Conant says. Being able to dynamically do MIPS for MR and co-registration of various modalities helps with reading efficiency. The user-friendly pallet allows physicians to move easily between patients, “parking” a case to view a stat case and not losing their place.

Physicians further benefit from digital folders that are good for gathering similar types of patient images when creating teaching files. No more stickies to remember which are good examples of cases and images for talks or articles. “Now I manage those notes electronically,” Friedewald says. “It is super intuitive and easy, and they are anonymized.”

Northwestern is currently working to smooth access to images beyond radiologists, too. Breast surgeons are benefitting from cases prefetched the night before they are needed and placed in a folder in PACS for quick access for viewing or surgery planning. The same will work for oncologists or others who need access to images, allowing them to organize studies and findings by patient.

Last but not least, the physician experience at both institutions may be better than it’s ever been.

“There is no way we’d go back to our old workflow,” Conant says. “The inefficiency is gone and confidence is higher.”

“We know we are seeing what we need to see now,” adds Friedewald. “We have minimized numerous risks, allowing us to provide better care for patients. That is why we are here.” ■