

MRI designed specifically for breast has major impact on clinical management of breast disease

Dedicated Facility Selects Dedicated Breast Imager



Rebecca G. Stough, M.D.

She's seen it as a tiny shadow on a sheet of medical film, a group of microcalcifications in an eerily familiar cluster, a progression of curves on a high-resolution computer screen — and a look of fear on the face of a woman newly diagnosed with a difficult disease. As Clinical Director of Breast MRI of Oklahoma, LLC and Radiologic Director of Mercy Women's Center — an innovative facility in the vanguard of research and clinical application of new diagnostic imaging technologies — Dr. Rebecca G. Stough knows breast cancer.

She also has seen it using a full range of imaging modalities, and is a pioneer in the use of MRI for cancer evaluation and treatment planning, as well as for screening of high-risk women. "MRI is far superior to any breast cancer imaging tool we have, when used appropriately," she says. "The medical community is just beginning to mine its full potential."

"To deliver cutting edge care in the community, Mercy has relied on the Aurora Dedicated Breast MRI since 2003. Upgraded to 1.5T in 2004 with UltraRODEO® High Resolution technology, their Aurora delivers industry-leading, ultra-thin 1mm slices for superior resolution and clarity.

"Aurora's image quality is now even more spectacular. The true extent of a tumor, its vessels and margins are clearly demonstrated on images," explains Dr. Stough.



Mercy Women's Center, home of Breast MRI of Oklahoma, in Oklahoma City.

"The sequences and image orientations are excellent. It is so intuitive. You know just where you are in space. The image processing hardware is comprehensive and some of the most advanced available today."

While many women's imaging practices are just getting started in MRI, over the years, Mercy Women's Center — a part of Mercy Health Center in Oklahoma City — has developed carefully defined protocols for exactly when and how to use the modality. Dr. Stough has become an internationally recognized expert in interpreting the nuances of these complex images through long hours of dedication and practice.

While committed to bringing cutting-edge diagnostic care to a full range of patients, Mercy also serves as a model for how high-quality breast imaging with top-of-the-line equipment can increase the profitability of a women's center, as well as benefit the associated surgeons and hospital.

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A History of Innovation

Mercy Women's Center was the first facility in Oklahoma to acquire digital mammography, as well as to incorporate breast MRI into routine clinical practice. Mercy is also one of the most active research centers in the U.S. assisting with the development of a screening blood test to detect early breast cancer.

Aware that some breast cancers were not visible on mammography and ultrasound, Mercy made a decision in 2001 to pursue breast MRI as an adjunct to gold-standard mammography to provide patients with a higher standard of care. Originally, Dr. Stough utilized a whole-body MRI in the main hospital with a specialized breast coil.

"While the exams clearly added important information in many cases, they took a full hour to perform and an additional hour to read," reports Stough, noting that without specialized breast image processing software, many image interpretation calculations were computed manually. The technology also did little to compensate for artifacts and other image inaccuracies — and patient breathing or motion on the subtraction images could easily obscure a DCIS. However, MRI had a major impact on Mercy's clinical management of breast disease, and the entire multi-disciplinary team was convinced of its value overall.



Table contoured for breast anatomy enhances comfort, minimizes motion artifacts.

Aurora Delivers Multiple Benefits

After conducting a comprehensive search to step up its MRI equipment in 2002, Mercy made the switch to the Aurora Dedicated Breast MRI in 2003, the only system specifically developed to meet the unique demands of breast imaging. Once upgraded to 1.5T and UltraRODEO high resolution, new efficiency and accuracy were added as Aurora shortened both the scanning and reading process, while dramatically improving image quality and precision.

Stough notes that image enhancements were due in part to Aurora's unique UltraRODEO technology that automatically provides specialized pulse sequences to suppress fat and normal ductal tissue, minimizing the hot spots that can complicate other MRI images. UltraRODEO also yields increased conspicuity of breast lesions, allowing for greater sensitivity and specificity of diagnosis. Moreover, the physician workstation with AuroraCAD™ fully automates such functions as 3-D reconstruction, subtractions, time-activity curves, measurements, MIP and sophisticated manipulation of images, making interpretation faster and more accurate.

Another benefit realized through Aurora's Dedicated Breast MRI is that rather than utilizing hospital MRI technologists, Mercy was able to switch to mammographers familiar with the nuances of breast imaging as well as the need to promptly schedule these anxious patients, as needed.

A Continuous Upgrade Path

Keeping up with Aurora's cutting-edge upgrade path, today Mercy takes advantage of the Aurora MRI's ability to simultaneously scan both breasts, as well as the chest wall and axillae, to create a high-quality, bilateral image for easy breast comparison, while paring down scanning time. "With the 1.5T magnet and UltraRODEO technique, the quality is so high," she says, "diagnosis can almost be made, based on the MIP alone."

To make the most of the modality, Mercy's strict protocols call for the use of MRI only for lesion evaluation and treatment planning for newly diagnosed breast cancer patients, for evaluation of treatment in progress, for carefully designated high-risk patients, and for obtaining additional information on patients with inconclusive diagnostic evaluation using other modalities. Mercy adheres to strict guidelines. For example, if a patient has a palpable mass that cannot be visualized on a mammogram, a MRI would be used only if the ultrasound is also negative.



AuroraCAD™ workstation designed specifically for breast imaging.

"MRI can provide vital information about the specificity of a cancer diagnosis, the location and size of a lesion, and the presence of additional lesions. Often it can even identify cancers not seen on other modalities," according to Stough. "This is vital for planning the most effective interventions. Our goal is to do the correct surgery the first time. Our surgeons don't operate without an MRI to guide them. It is key to their diagnostic confidence."

Multi-Modality Interpretation Important

Dr. Stough emphasizes that review of the mammograms and ultrasound is necessary to maximize the positive impact of MRI. **"Looking closely at the same area of interest on all three modalities will significantly minimize the false positive MRI rate,"** she says, noting that the whole is definitely greater than the sum of the parts. And naturally, the better the image, the better the diagnosis. That's another reason the high quality and intuitive presentation of an Aurora-dedicated breast MRI image is so important, according to the highly experienced radiologist.

Underscoring this, Dr. Stough points to a long list of cases in which their Aurora MRI visualized lesions not seen on other modalities, or significantly altered a patient's treatment plan by providing more extensive information. She adds, "At our facility, it changes the surgical plan about 20 percent of the

time. At Mercy, the re-operation rate after lumpectomy because of positive margins was 30 percent before Aurora, and is now less than 10 percent. That's amazing."

Significantly Increased Referrals

Contributing to Mercy economically as well as clinically, according to Dr. Stough, the Aurora has helped Mercy to achieve a status similar to a tertiary referral center for the area, while affiliated Mercy surgeons become recognized as sought-after breast specialists. In fact, surgeons from all over the state now refer patients to Breast MRI of Oklahoma for MRI exams before surgery, or to work up diagnostic problems. If, following this, a second look in another modality is needed, often the Women's Center is selected for the exam. Patients with identified lesions are also being referred for stereotactic and ultrasound biopsies, and then return to their surgeons for treatment.

"Insurance pays well for these studies, and they are being approved more frequently because more appropriate treatment saves the system money," says Dr. Stough. "Absolutely, I think a breast MRI can make a breast center profitable."

Another positive dividend of Mercy Women's Center's cutting-edge technology is that the hospital's surgeons, as key players in the interdisciplinary team, have benefited by dramatically increased referrals. Breast cancer surgeries rose from 150 to 250 per year immediately after installation of Digital Mammography, and have shot up to 350 since the installation of the Aurora.

Dr. Stough adds, **"It is surprising how often an unsuspected additional cancer, equally or more severe than the index cancer, is discovered. There is no question that lives have been saved because our patients had an Aurora breast MRI."** To the talented, dedicated radiologist, that's the true bottom line.

AURORA
ADVANCING BREAST IMAGING