



**Improving dense breast evaluation**

# **With 3D volumetric- breast ultrasound**

How the Breast Center of Acadiana improved  
its ability to detect cancer

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## Improving dense breast evaluation

# With 3D volumetric-breast ultrasound

How the Breast Center of Acadiana improved its ability to detect cancer

*Gary Mathews, MD, and his team realized the potential to improve detection of breast cancer using handheld ultrasound in women with mammographically dense tissue long before they added automated 3D breast ultrasound.*

*“Occasionally, we would serendipitously discover a coincidental small cancer that was not palpable or detectable by mammography while doing a diagnostic ultrasound to evaluate something else nearby which was not cancer,” Dr. Mathews said.*

### Tackling difficult-to-characterize lesions in dense breast tissue

The evidence is more than anecdotal. Characterizing lesions in dense breast tissue with a high level of clinical confidence can be challenging, and a growing body of research suggests that mammography alone may not be enough. Numerous studies and published guidelines validate the usefulness and growing acceptance of screening breast ultrasound. A recent study in *Academic Radiology* noted that a combination of screening mammography and whole-breast automated ultrasound is superior to mammographic screening for women with increased breast density or who are at a high risk of developing breast cancer.<sup>1</sup>



Founded by Gary Mathews, MD

Locations in Lafayette & Youngsville, LA

- Performs more than 240 breast ultrasound studies per month as part of a comprehensive screening program
  - Documented a 110% increase in cancer detection in 2015 with automated whole breast ultrasound
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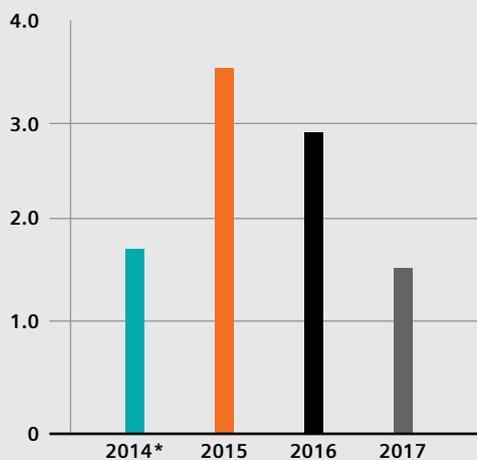


*“Our single priority is to do what’s best for our patients. We strive to save as many women as possible from dying from breast cancer.”*



—and with that philosophy as the cornerstone of its patient care, the Breast Center of Acadiana team integrated automated 3D volumetric breast ultrasound into its breast cancer early detection program in 2015.

# ACUSON S2000 ABVS cancer detection rate



**Figure 1.** ACUSON S2000 ABVS alone Cancer Detection Rate (CDR) at Breast Center of Acadiana between 2014 and 2017. There was a 110% increase of CDR in 2015 since adopting the ABVS unit in 2014. There was also a decrease of 18.9% and 47.7% in CDR during 2016 and 2017, respectively. This is mainly due to exhaustion of target Mammography-occult cancer patients in the local area. All ABVS scans were either BIRADS® category C (Heterogeneously Dense) or D (Extremely Dense).

\*Only 8 months of data was collected during 2014.

## How the technology of ABVS overcame the challenges of implementing a screening breast ultrasound program

While adding handheld breast ultrasound to screening mammography would provide significant improvement in cancer detection rate (CDR) in women with dense tissue, there were major drawbacks which prevented its feasibility and acceptance:

- The nature and logistics of handheld real-time scanning, which is suitable for targeted diagnostic evaluations, proves to be unsuitable to scale and standardize for high-volume screening practices.
- High-risk ergonomics combined with the monotony of screening “well” patients, resulting in repetitive stress injury and decreased job satisfaction for technologists.
- Long scan time causes inefficient workflow, which is costly and not adequately reimbursed by insurance.
- Operator-dependent responsibility of detection inherently tied to the real-time scanning process creates the dilemma of more frequent and more time-consuming scanning by the radiologist.

3D breast ultrasound addresses many of these issues.

Once it was FDA approved and centers started using this technology, the team at Breast Center of Acadiana began to evaluate the practicality and feasibility of implementing automated 3D breast ultrasound with the intent to choose the system that best fit their needs. Their priorities included the following criteria:

- Reliably and efficiently provide good quality imaging of the entire breast volume.
- Create a 3D rendering that could be efficiently stored, retrieved, and viewed.
- Automate the process.
- Provide standardized, efficient, and easy acquisition for technologists.
- Provide the option of using handheld 2D evaluation at the technologist’s discretion to better characterize a potential finding seen on the 3D automated scan.
- Provide standardized, efficient, and easy viewing and interpretation for the radiologist.

*After careful evaluation of available options in the market, Dr. Mathews chose the ACUSON S2000™ Automated Breast Volume Scanner (ABVS), HELX Evolution with Touch Control from Siemens Healthineers.*



## **A hybrid solution to support greater clinical confidence**

Equipped with capabilities to support both automated breast volume scanning and handheld exams as needed, the ACUSON S2000 ABVS HELX Evolution with Touch Control is the perfect system for any breast center.

The ACUSON S2000 ABVS combines 2D and 3D ultrasound as well as advanced technologies, such as elastography and multimodality review, along with automated acquisition and an intelligent workflow solution.

*The center's ultrasound technologists had previous experience with handheld ultrasound, which helped them quickly implement the ACUSON S2000 ABVS. Three additional certified mammography technologists were trained with the help of application specialists from Siemens Healthineers.*

When a technologist or a sonographer recognizes a suspicious finding, or tissue that is suboptimally visualized, during or immediately after acquisition of the automated scan, they can immediately switch to the handheld transducer on the same unit and do a targeted real-time evaluation. The technologist or sonographer can then easily acquire and annotate appropriate still images that will either clear or better characterize the questionable finding. In Dr. Mathews experience, this process greatly improves specificity without taking too much time. By using this 2D/3D hybrid approach, the Breast Center of Acadiana greatly improves the recall rate for its dense breast patients, and their referring physicians experience a higher level of confidence in the quality of care experienced by their patients.

## **Meeting the growing demand for dense breast imaging**

With the technologists and the ACUSON S2000 ABVS in place, the Breast Center of Acadiana offers 3D total breast ultrasound to every one of its patients who have dense breasts—approximately 40% of its patient population.

Patients who are mammographically dense who choose to have screening ultrasound will typically first have a mammogram, which will be completed within 30 minutes of signing in. Then, within a 20 minute or less wait, the patient will receive the 3D ultrasound exam, which takes 20–30 minutes. Total time to have both is typically 1 to 1½ hours.

The 3D ultrasound can be read immediately after completion or, as in most cases at the Breast Center of Acadiana facility, many are read in batch later. With few exceptions, all screening ultrasounds are read and reported together in a combined report with the mammogram. Reading time for both screening mammogram and ABVS is three to five minutes.

All women with dense tissue (BIRADS density category C or D) are informed and counseled about the decreased sensitivity of mammography in their case, and screening breast ultrasound is offered in addition to mammography to add sensitivity to detect small breast cancer. Louisiana law (enacted in 2016), requires all mammography facilities to notify patients about their breast density (if applicable). Dr. Mathews and his team were, however, educating doctors and their patients, paving the way for, and providing, supplemental imaging well before the law took effect.

## Documenting their results and conclusion

To evaluate the impact 3D breast ultrasound had on their practice, Dr. Mathews and Jean Kloss, RN, patient coordinator, studied all 2015 screening mammogram patients. The increase in cancer detection was significant, rising by 3.6/1,000 (110%) in 2015. Dr. Mathews did note, however, that after an initial increase in cancer detection rates, centers can often expect a decline.

“If you have a steady patient population that returns for regular exams, you will find a larger number of cancers the first two years after adding screening ultrasound,” says Dr. Mathews, “since most of the previously undetectable cancers will be found and taken out of the population.

“After the first two rounds of screening, mammographically occult cancers found by screening ultrasound will more accurately reflect the detection rate of new cancer added by ultrasound screening. In our screening program, after the first two years breast ultrasound added approximately 1.5–2.0 cancers/1,000 to our detection rate.”

Through this data and his own observations, Dr. Mathews is convinced that offering 3D total breast ultrasound to women with dense breast tissue as an adjunct to screening mammography is the right thing to do for patients.

“Less than half of women with dense tissue choose to have screening breast ultrasound. If more women with mammographically dense tissue had 3D total breast ultrasound, then the cancer detection rate for our screening program would be predicted to grow even more, as much as 50% higher in our practice,” he says. “The addition of screening breast ultrasound in women with dense tissue finds more cancers than mammography alone.”



**27 million**

Estimated number of women aged 40–74 years old who have heterogeneously or extremely dense breasts in the U.S.<sup>3</sup>

*“Mammographic breast density is a strong risk factor for developing breast cancer and also impairs mammography performance.”<sup>4</sup>*



**Gary Mathews, MD**

Lafayette, LA region's first radiologist solely dedicated to breast imaging.

Experience includes more than:

- 200,000 mammogram interpretations
- 4,700 image-guided needle procedures
- 2,000 breast cancers diagnosed

**3/4**

**U.S. states require breast density notification\***

\*As of July 2019<sup>2</sup>, national breast density inform legislation was enacted on February 15, 2019.

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We are a leading medical technology company with over 170 years of experience and 18,000 patents globally. With more than 48,000 dedicated colleagues in 75 countries, we will continue to innovate and shape the future of healthcare.

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## Resources

<sup>1</sup>Grady I, Chanisheva N, Vasquez T. The Addition of Automated Breast Ultrasound to Mammography in Breast Cancer Screening Decreases Stage at Diagnosis. *Academic Radiology*. 2017; 24(12):1570–1574.

<sup>2</sup>DenseBreast-Info.org Hails Federal Law that Mandates that Mammography Reports Include Breast Density Information [Internet]. Deer Park: PR Newswire. 2019 Feb 19 [cited 2019 July 8]; Available from: <https://www.prnewswire.com/news-releases/densebreast-infoorg-hails-federal-law-that-mandates-that-mammography-reports-include-breast-density-information-300797661.html>.

<sup>3,4</sup>Sprague B, Gangnon R, Burt V, et al. Prevalence of Mammographically Dense Breasts in the United States. 2014 Oct [cited 2018 Jun]. Available from: <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4200066/>.

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