The goals of any screening program are to find cancers early and reduce false positives. Multiple studies have now shown that the addition of 3D Automated Breast Ultrasound (ABUS) to screening mammography results in a significant increase in invasive cancer detection with a nominal insignificant decrease in specificity.1

"Even before density inform laws, screening breast ultrasound has been widely accepted in New York. As a result, our approach to ABUS has been a little different. We didn't look at ABUS as an opportunity to implement a breast ultrasound screening program, but rather to look at how ABUS can provide workflow and patient care benefits over the use of handheld (HHUS) ultrasound," said Dr. Nina Vincoff, Chief of Breast Imaging at Northwell Health in New York.

"ABUS has allowed us to re-focus our goals for screening breast ultrasound. ABUS enables us to focus more on looking for suspicious lesions and spend less time on complicated cysts and well-circumscribed nodules. With traditional HHUS workflow, you receive a report with measured and recorded lesions, it becomes difficult to not conduct short interval follow-up," added Dr. Vincoff.

Monica Saini, MD, CMO of Institute of Women's Imaging and newly appointed Medical Director for ABUS at GE Healthcare agrees, "Sonographers are trained to identify as many things as possible, cancer or not. The automated acquisition process of ABUS enables more of a true screening exam, where the operator acquires an entire data set which is sent to the radiologist to determine what is a finding and what isn't."

According to Dr. Vincoff, a radiologist may feel more comfortable than a sonographer calling a cyst or a fat nodule rather than a solid nodule. "Putting images in hands of radiologists has been helpful to our patients as we’re getting more definitive reads on our ultrasound. This becomes the new normal and takes operator dependence out of the screening exam," noted Dr. Vincoff.
3D ABUS for Diagnostics – What’s Your Objective?

Why move beyond screening to look at diagnostic applications for ABUS? According to Dr. Saini, it is partially because of its success as a supplemental screening tool for women with dense breasts – finding an additional 1.9 cancers per thousand.\(^2\) Results recently published in the *American Journal of Roentgenology (AJR)* showed that for cancers originally missed with mammography in women with dense breasts, the addition of ABUS demonstrated a relative increase in sensitivity of 62 percent.\(^3\)

“High breast density doesn’t just go away once we shift to the diagnostic workup process. The patients still have dense breasts and we need to look at the whole breast to find all areas of concern and larger areas of disease,” noted Dr. Saini. “With mammography, we, as radiologists, look at the entire breast; shouldn’t we be doing the same thing with breast ultrasound? Why ignore the rest of the tissue or the other breast or be influenced by a few still images captured by the sonographer?”

Dr. Saini emphasizes that this does not mean eliminating the use of HHUS. “Quite the contrary, we can use ABUS to start answering questions for that patient. Once we have localized abnormal findings, we can decide to move to a targeted HHUS exam where the sonographer can use color Doppler or elastography to help further characterize malignant lesions or multifocal disease.”

The use of ABUS for diagnostic exams comes down to how it helps meet the clinical objective of completing a thorough exam, identifying areas of concern, and evaluating areas of high breast density.

According to Dr. Jason S. Davis, OSF Healthcare in Bloomington, Illinois, while the ACRIN 6666 breast methodology and other supporting studies suggest that six images are sufficient for an exam, that is not a complete dataset. “ABUS provides a global view of the breasts, which helps give radiologists a better idea of “normal” for that patient. This has the opportunity to not only help reduce false positives but also reduce BI-RADS® 3, which is sometimes over-used on lesions that don’t look malignant but may not be benign either. ABUS gives a global view and helps reduce operator dependence, which makes it easier to ignore false positives,” adds Dr. Davis.

### Evolving Diagnostic Applications

Areas to consider for diagnostic use of 3D ABUS:

#### Diagnostic
- Palpable mass
- Breast pain
- Nipple discharge
- Inconclusive mammogram
- Second look after mammogram

#### Staging
- Pre-surgical staging
- Breast reduction planning

#### Surveillance
- Monitor suspicious lesions
- Treatment monitoring
- Lumpectomy follow-up

#### Other Dx Patients
- Young women
- Implants
- Pregnant/nursing women
- Referrals/remote locations
- Mammography sensitive/radiation adverse women
- Disabled women/unable to stand
According to Dr. Ian Grady, North Valley Breast Clinic, Redding, CA, ABUS is very useful for supplemental screening. However, where the utility of ABUS really comes in is the ability to combine different applications at once. For example, a woman presented with a palpable mass in the left breast and increased density on mammography. The mass was suspicious on ABUS, but we found no other findings. Once we did a biopsy and confirmed it was malignant, we went back and reviewed the same study again to see if there were any foci of malignancy that would impact her surgical plan. Using ABUS, we accomplished three goals: we did her screening, did her diagnostic workup and pre-op staging workup prior to her cancer surgery – all with one study.

“The power of ABUS imaging and preserving the whole dataset provides tremendous economies of scale. The ability to combine applications in one exam – makes your screening and diagnostic program much more efficient,” noted Dr. Grady.

A strong proponent of ultrasound breast screening, Dr. Davis indicates that the more he used ABUS and became more comfortable with the presentation of the images, specific patient cases have opened his eyes to potential diagnostic applications. For example, an 18-year-old woman presented nine years ago with bilateral masses, which were documented as FAs with HHUS. She is too young for regular mammograms, but we want to conduct occasional follow-up, which we now do using ABUS. Another 18-year-old woman recently presented with bilateral breast pain and vague lumps. “The ABUS exam was normal but included areas of concern. In both cases, the need for reproducible dataset and global view for future surveillance was critical – something that we cannot accomplish using HHUS,” noted Dr. Davis.

Ultimately, ABUS is Ultrasound

“ABUS is breast ultrasound. It’s simply a new way of using a technology that has been around for a long time,” added Dr. Davis. “The acquisition process and the dataset may be different than what we’re used to with HHUS, but ultimately, it is ultrasound, which means it can be applied for screening and diagnostic purposes – the key is proper patient selection.”

Dr. Grady agrees that one of the primary contributions of ABUS is improving breast cancer screening and lowering the stage of disease at detection and diagnosis. “Capture those advantages with screening and build a great ABUS screening program. Then, as you learn and get more comfortable with ABUS, look for new applications to bring the benefits of this innovative, cost-effective and patient-friendly tool to your practice and your patients.”
Mammographically occult invasive ductal carcinoma detected with ABUS in a 34 y/o woman with extremely dense breasts. Patient underwent neoadjuvant therapy to reduce tumor size prior to surgery. Complete volumetric ABUS data sets provide a standardized view to compare tumor size before (left image) and 3 months after therapy (right image).

**ABUS Publication Summary**

**Automated Breast Ultrasound in Breast Cancer Screening of Women with Dense Breasts: Reader Study of Mammography-Negative and Mammography-Positive Cancers**

**Conclusion:** The authors concluded that combining mammography with ABUS, compared with mammography alone, significantly improved readers’ detection of breast cancers in women with dense breast tissue without substantially affecting specificity.

**Adding 3D Automated Breast Ultrasound to Mammography Screening in Women with Heterogeneously and Extremely Dense Breasts: Report from a Hospital based, High-volume, Single-center, Breast Cancer Screening Program**

**Conclusion:** The authors concluded that addition of 3D ABUS to FFDSM in women with ACR3 or ACR4 breast density significantly improved invasive breast cancer detection rate with an acceptable recall increase.
Assessing Improvement in Detection of Breast Cancer with Three-dimensional Automated Breast US in Women with Dense Breast Tissue: The SomoInsight Study
**Conclusion:** The authors concluded that addition of ABUS to screening mammography in a generalized cohort of women with dense breasts increased the cancer detection yield of clinically important cancer, but it also increased the number of false-positive results.

Interreader Scoring Variability in an Observer Study Using Dual-Modality Imaging for Breast Cancer Detection in Women with Dense Breasts
**Conclusion:** The authors concluded that a modest, but statistically significant, increase was observed in interreader agreement after implementation of ABUS.

Using Automated Breast Sonography as Part of a Multimodality Approach to Dense Breast Screening
**Conclusion:** The authors concluded that this preliminary study offers automated breast sonography is a promising cost-effective adjunct diagnostic modality to MRI in the evaluation of women with increased breast density by digital mammography.

Invenia ABUS Mastery Education Program
Led by peer educators, the physician program features comprehensive coaching in Invenia ABUS exam interpretation designed to help heighten users’ ability to identify normal breast anatomy and differentiate between lesions with benign and malignant pathology. Detailed analytics enable participants to gauge their performance compared to their counterparts and identify areas for improvement.

Learn more about the Invenia ABUS Mastery Program
Download the Invenia ABUS Mastery Program Education Sheet
Learn more about Invenia ABUS
View the Invenia ABUS acquisition process
Learn more about the benefits of Invenia ABUS

Webinars

**Developing a Personalized Screening Program**
Joseph Russo, MD, Section Chief of Women’s Imaging, St. Luke’s University Health Network, Bethlehem, PA

**Dense Breast Tissue: Status of Ultrasound for Breast Cancer Screening**
Marc F. Inciardi, MD, Assistant Professor of Radiology, Section Head, Breast Imaging, University of Kansas Medical Center

**Implementation of ABUS in the Community Setting**
Monica H. Saini, MD, MS, Chief of Breast Imaging, Santa Fe Imaging/Christus Medical Center

**Screening Ultrasound**
Ian Grady, MD, FACS, North Valley Breast Center, Redding, CA

**Automated Breast Sonographic Coronal Imaging: Diagnostic and Screening Applications**
Beverly E. Hashimoto, MD, FACR, Section Head, Ultrasound, Virginia Mason Medical Center, Seattle, WA

**Dense Breast Tissue: The Radiologic Dilemma**
Jessie Jacob, MD

**Introduction to Automated Breast Ultrasound**
Jacqueline Bailey

Contact us

Visit the Invenia ABUS website

1. Refer to ABUS publication summary section in this document.

Imagination at work

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