

The Dense Breast and Advanced Screening Technologies

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Joyce Grube, MS, RDMS

Toshiba Application Specialist

Objectives

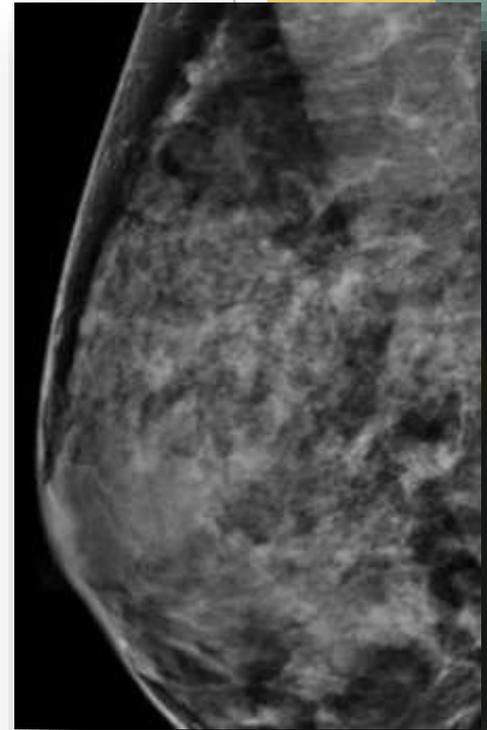
- ▶ Learn facts about dense breasts and how they make the diagnosis of breast cancer difficult.
- ▶ Recognize the impact of Dense Breast Laws.
- ▶ Discuss the direction of breast imaging in the future.

Facts

- ▶ Over 200,000 cases of breast cancer will be diagnosed in U.S. this year
- ▶ Mammography remains the gold standard by which all diagnostic breast imaging must compete
 - ▶ 98% accuracy in non-dense breasts
 - ▶ 48% accuracy in dense breasts

Kolb, MD, AMA Scientific Paper of the Year 9/2002

- ▶ But 40% of women have dense breast tissue!



Facts

- ▶ Breast cancers are far easier to see on a mammogram when surrounded by fatty tissue
- ▶ Mammography misses every other cancer in dense breasts
- ▶ Breast density predicts the accuracy of a mammogram at any age
- ▶ Breast density is a well-established predictor of breast cancer risk
 - ▶ Women with dense breasts can be 6 times more likely to develop cancer
- ▶ Radiologists have been reporting a woman's dense breast tissue to her referring doctor for twenty years

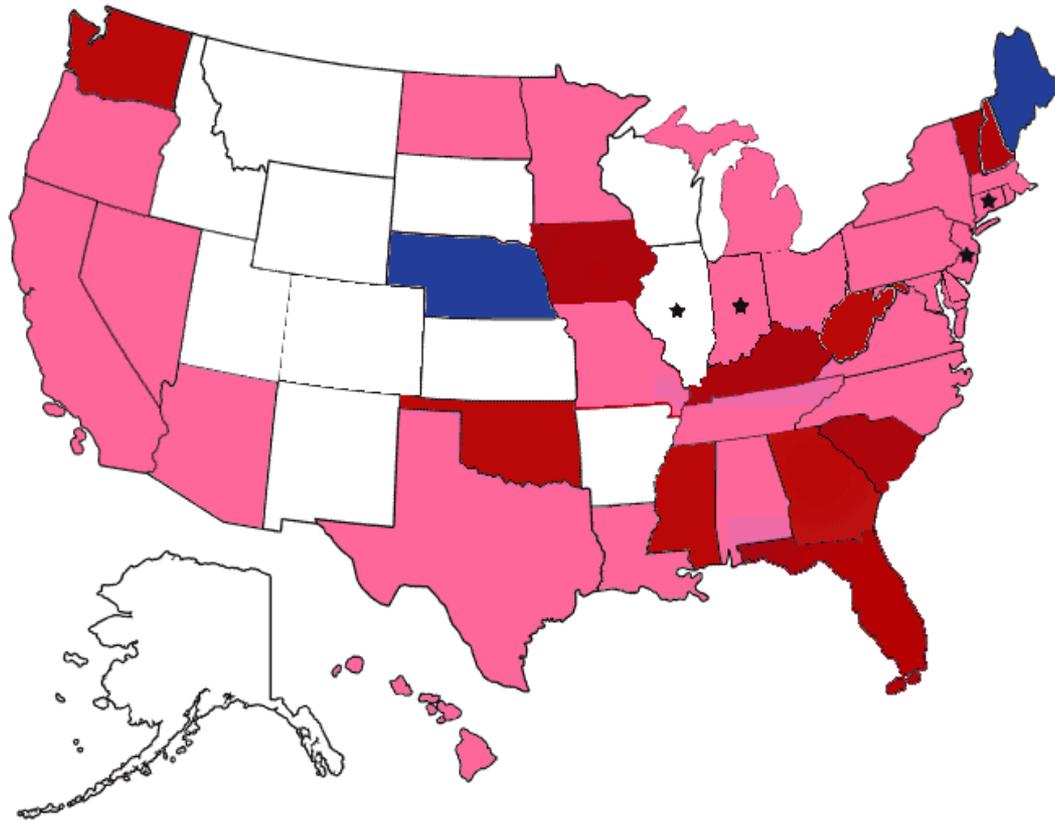
More Facts

- ▶ Breast density is one of the strongest predictors of the failure of mammography screening to detect cancer
- ▶ 2/3 of pre-menopausal women and 1/4 of post menopausal women have dense breast tissue
- ▶ Adding more sensitive tests to mammography significantly increases detection of invasive cancers that are small and node negative
- ▶ Women with dense breasts who had breast cancer have a 4 times greater risk of recurrence than women with less-dense breasts
- ▶ Women who are unaware of their breast density, believe their “Happy Gram” when it reports no significant findings and are at risk of receiving a later stage cancer diagnosis

Dense Breast Law

- ▶ All started in Connecticut, which has the 2nd highest incidence rate of breast cancer in the nation
- ▶ Nancy Cappello, age 51, was diagnosed with advanced stage breast cancer in 2004 after 11 years of negative mammograms stating she had “dense breasts”
- ▶ Connecticut Density Reporting Law was passed in 2009





- ▶ Since then, half of states have passed Dense Breast Laws (pink)
- ▶ 11 states have pending legislation (red)
- ▶ 2 states currently working on drafting a bill (blue)
- ▶ 4 states with Insurance Coverage Law (star)

Dense Breast Report

“Your mammogram indicates that you have dense breast tissue. Dense breast tissue is common and is found in forty percent of women. However, dense breast tissue can make it more difficult to detect cancers in the breast by mammography and may also be associated with an increased risk of breast cancer. This information is being provided to raise your awareness and to encourage you to discuss with your health care providers your dense breast tissue and other breast cancer risk factors. Together, you and your physician can decide if additional screening options are right for you.”

BI-RADS

- ▶ Breast Imaging Reporting and Data System
- ▶ Created by American College of Radiology (ACR) for Mammographic imaging
 - ▶ Standardize mammography reporting
 - ▶ Reduce confusion in breast imaging interpretation
 - ▶ Facilitate outcome monitoring
 - ▶ Standardize terminology
 - ▶ Indicate specific course of action
- ▶ Adapted categories to Ultrasound and MRI

BI-RADS

Category 0 = Needs Additional Imaging

Additional imaging evaluation needed before final assessment

Category 1 = Negative

No lesion found (routine follow-up)

Category 2 = Benign Finding

No malignant features; e.g. cyst (routine follow-up or age, clinical management)

Category 3 = Probably Benign Finding

Low probability of malignancy e.g. fibroadenoma (short interval follow-up)

Category 4 = Suspicious Abnormality

Intermediate probability of malignancy (biopsy should be considered)

Category 5 = Highly Suggestive of Malignancy

High probability of malignancy (appropriate action should be taken)

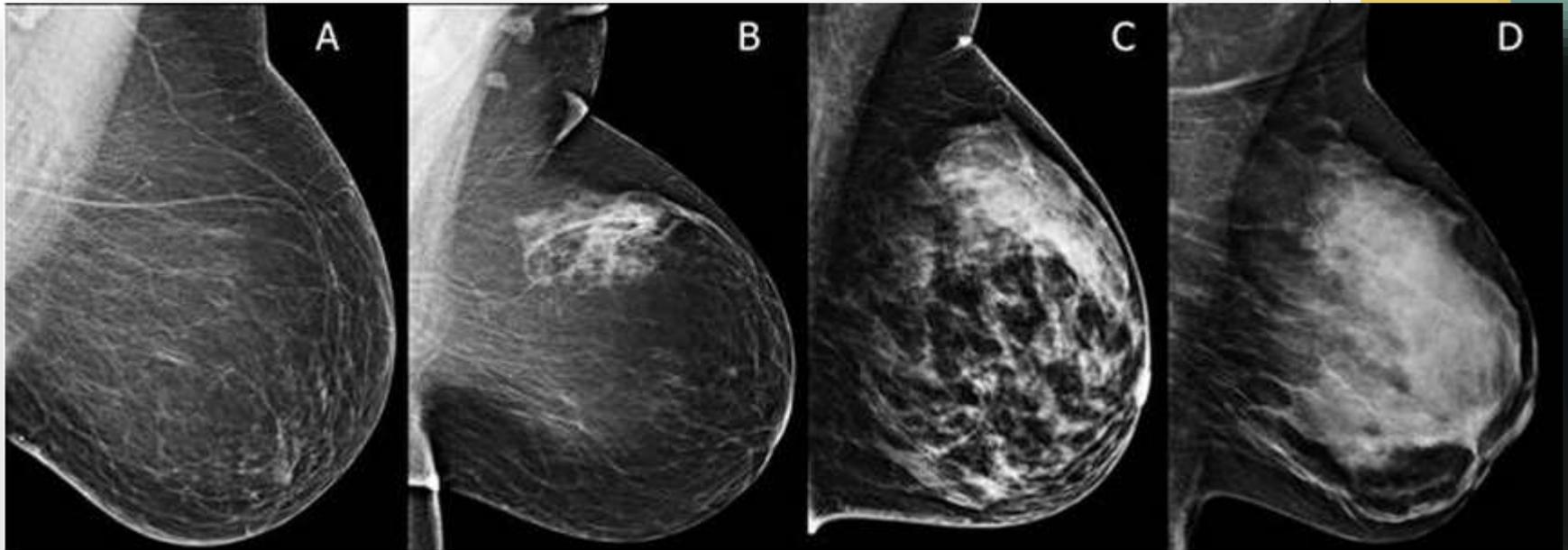
Category 6 = Known Biopsy-Proven Malignancy

Biopsy-proven breast cancer prior to treatment (appropriate action should be taken)

BI-RADS for Breast Density

Mostly Fatty (Level A)	The breast are made up of mostly fat and contain little fibrous and glandular tissue. This means the mammogram would likely show anything that was abnormal
Scattered Density (Level B)	The breasts have quite a bit of fat, but there are a few areas of fibrous and glandular tissue
Heterogeneously Dense (Level C)	The breast have many areas of fibrous and glandular tissue that are evenly distributed through the breasts. This can make it hard to see small masses in the breast.
Extremely Dense (Level D)	The breasts have a lot of fibrous and glandular tissue. This may make it hard to see a cancer on a mammogram because the cancer can blend in with the normal tissue.

BI-RADS for Breast Density



Fatty

Scattered

Heterogeneously
Dense

Extremely Dense

Insurance Coverage Law

- ▶ Connecticut, New Jersey, Illinois and Indiana require insurance companies to provide coverage for comprehensive ultrasound screening of an entire breast or breasts if a mammogram demonstrates heterogeneous or dense breast tissue based on the BIRADS criteria
- ▶ Breast Density and Mammography Reporting Act is pending federal legislation
 - ▶ HR 716
 - ▶ S 370

What Else?

- ▶ Breast density is the strongest risk factor associated with the development of breast cancer
 - ▶ Is a stronger risk factor than having two first degree relatives with breast cancer
- ▶ Tumor size, nodal status, and grade heavily influence the prognosis and survival
- ▶ Reducing advanced disease is a predictor of reducing breast cancer mortality
- ▶ **EARLY DIAGNOSIS MATTERS**

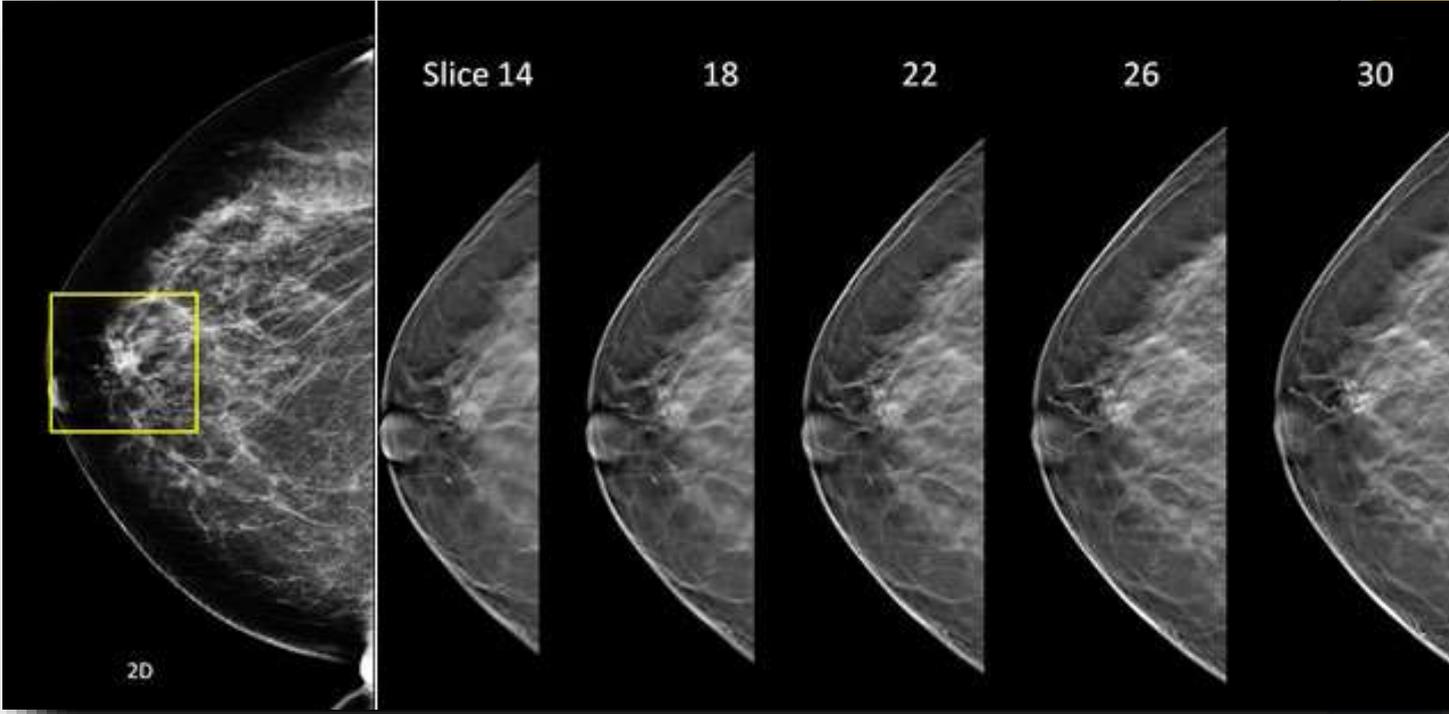
Impact?

- ▶ Explosion in additional breast imaging technologies!
- ▶ Tomosynthesis? **YES**
- ▶ Screening Breast Ultrasound? **YES**
- ▶ Automated Breast Ultrasound? **YES**
- ▶ Diagnostic Breast Ultrasound? **YES**

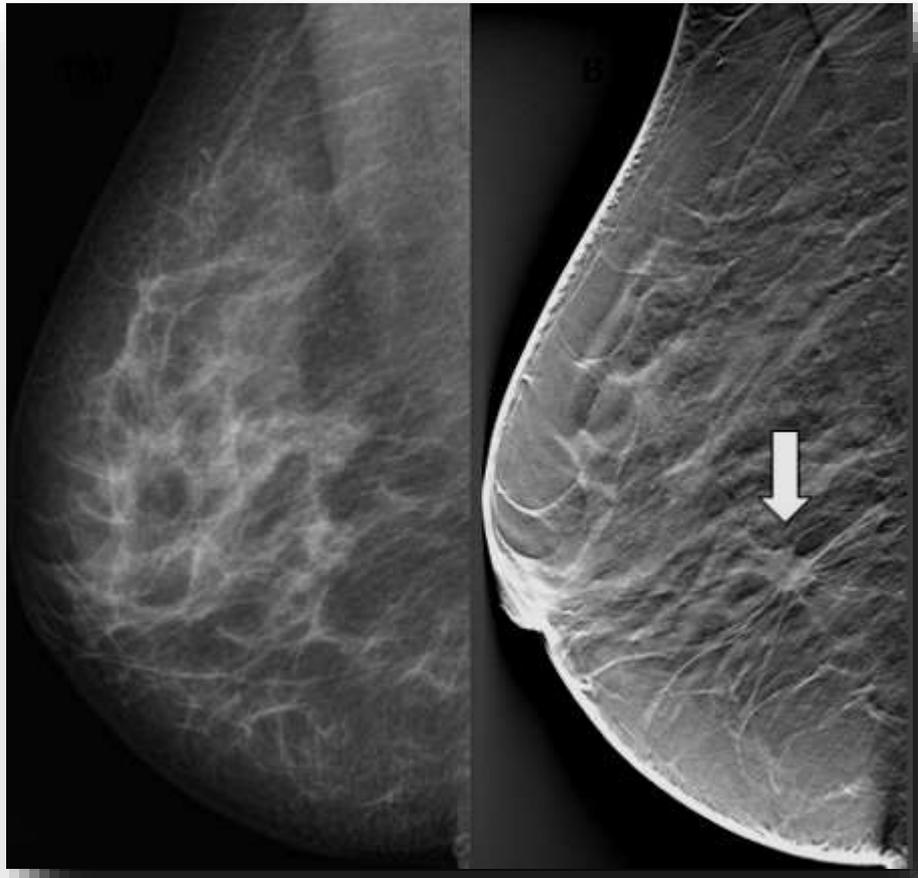
Digital Breast Tomosynthesis (DBT)

- ▶ 3D Mammography
- ▶ Takes hundreds of x-ray images in slices of the breast
- ▶ Created at Massachusetts General Hospital
- ▶ Significantly reduces false-positives, therefore, reduces unnecessary biopsies
- ▶ Increases the detection of invasive cancers over traditional digital mammography
- ▶ Diagnoses more small breast cancers

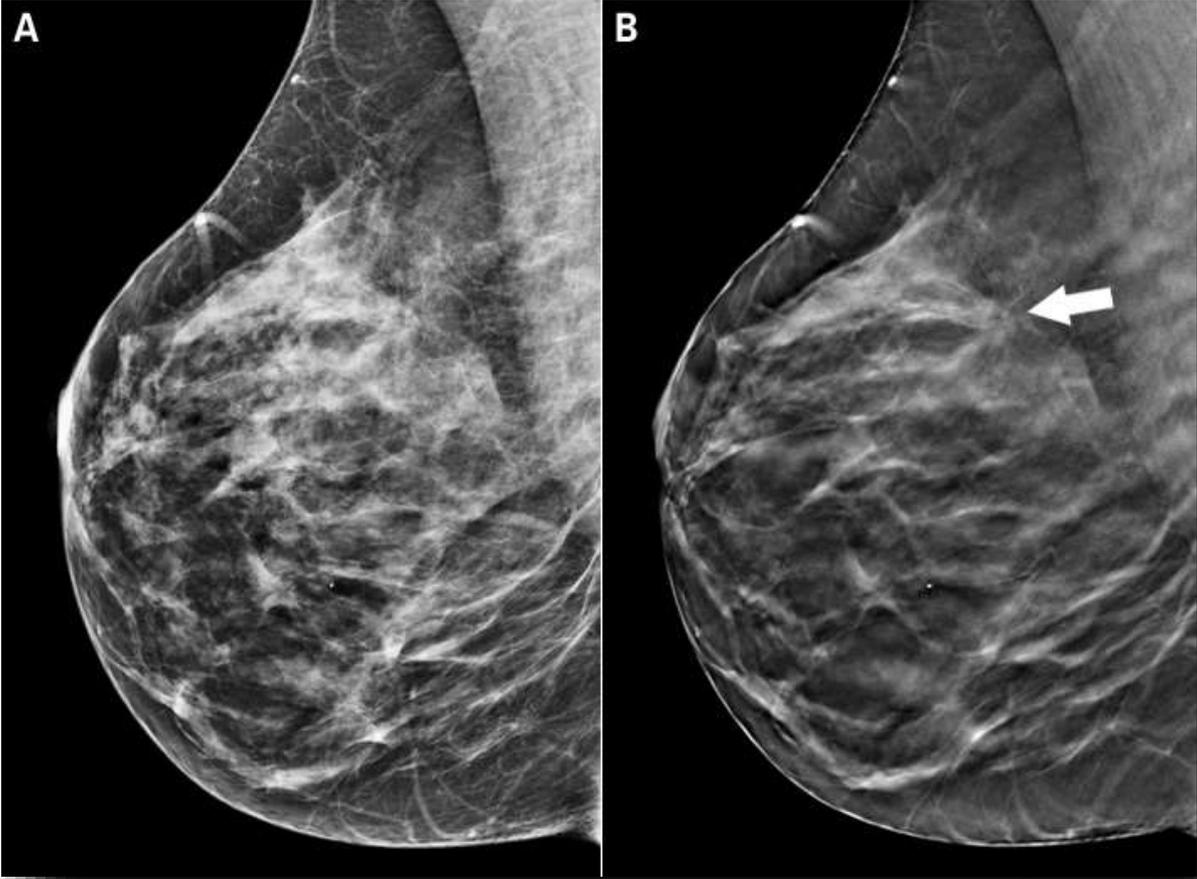
Tomosynthesis



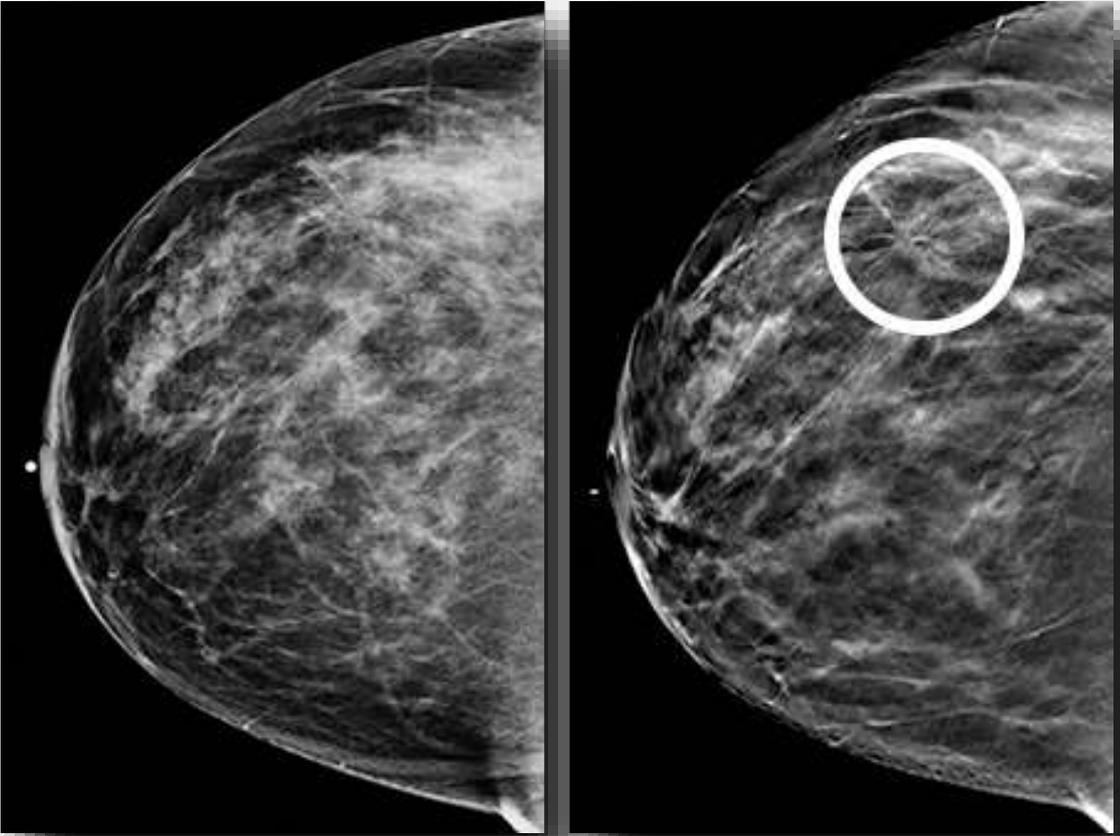
Tomosynthesis



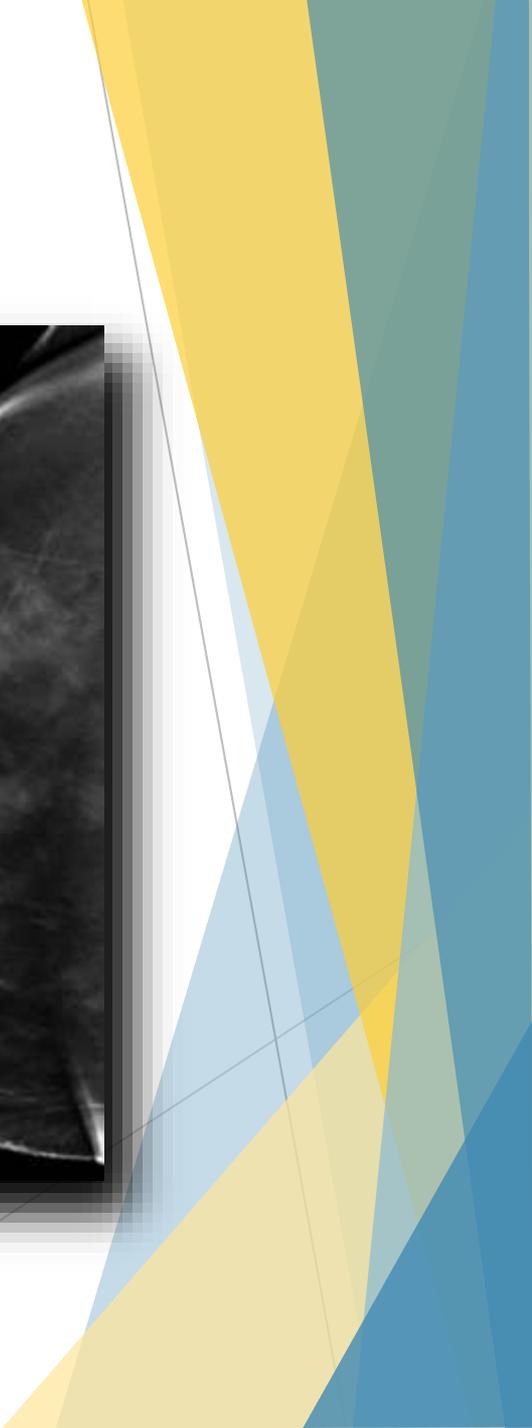
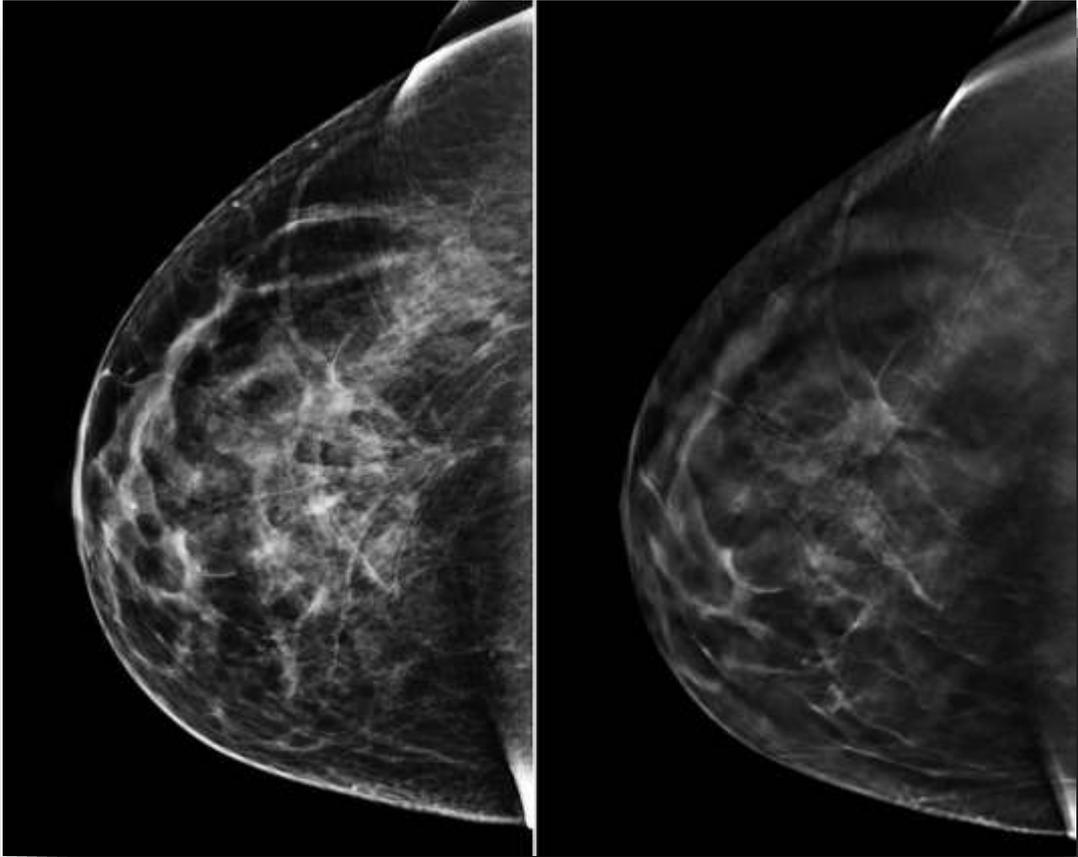
Tomosynthesis



Tomosynthesis



Tomosynthesis



Automated Breast Ultrasound

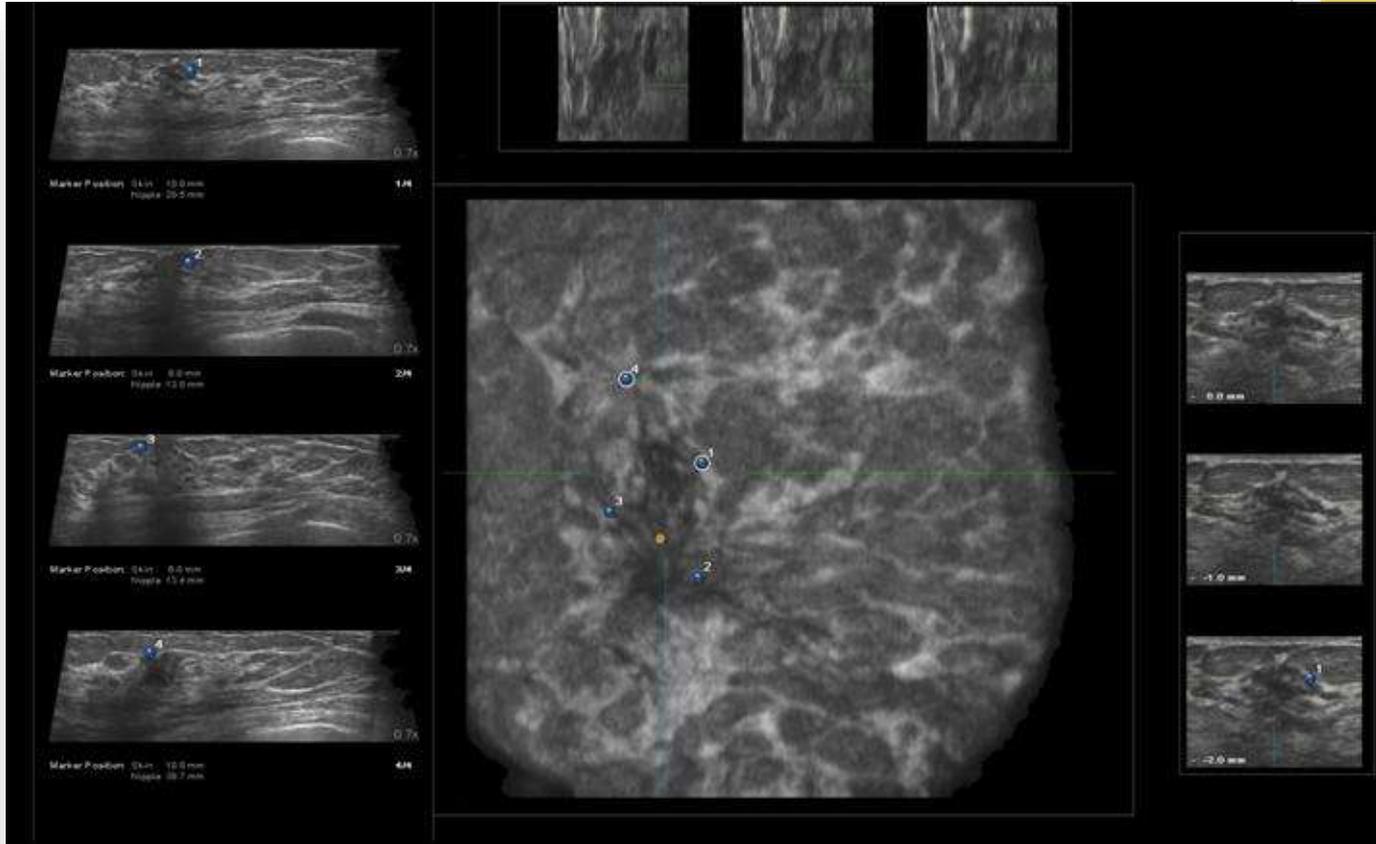


Automated

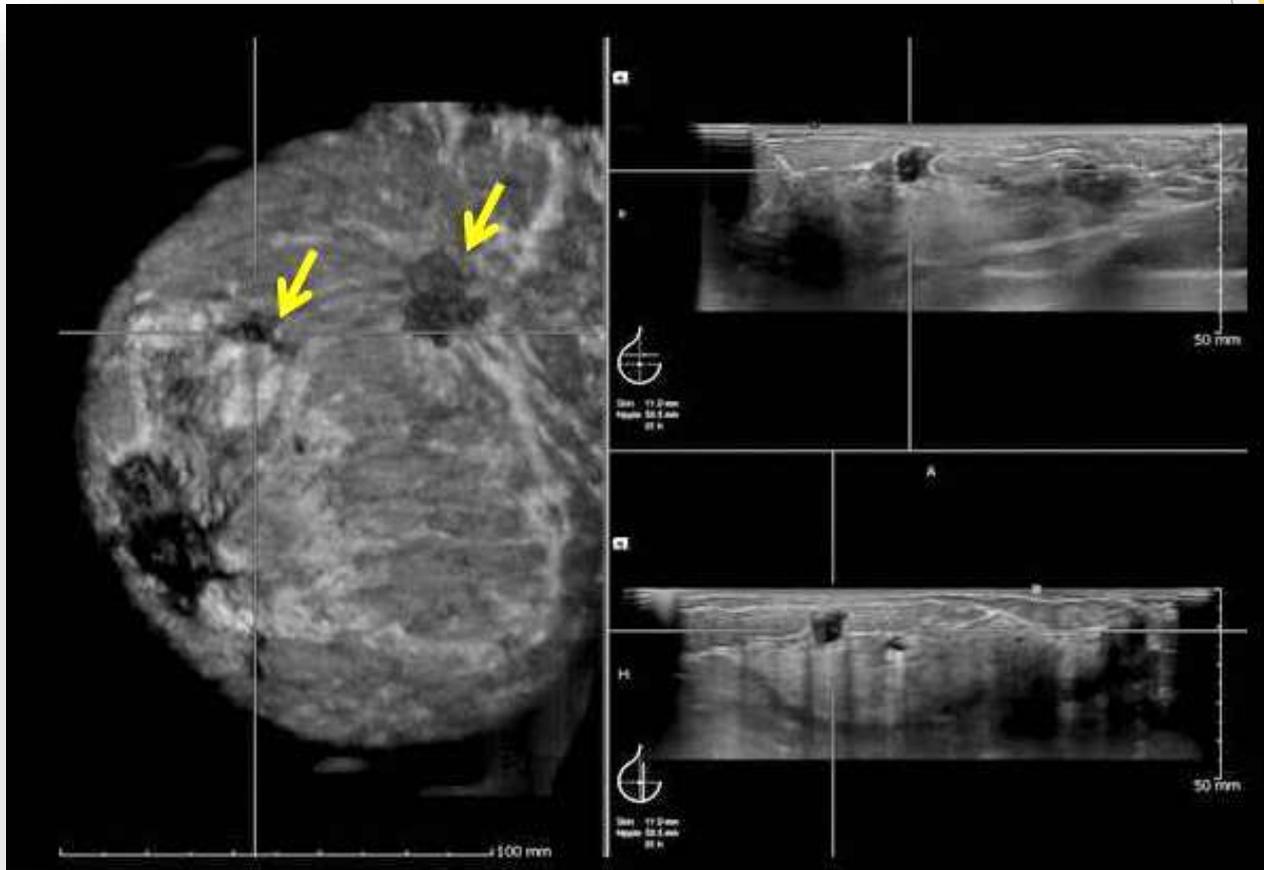


Semi-Automated

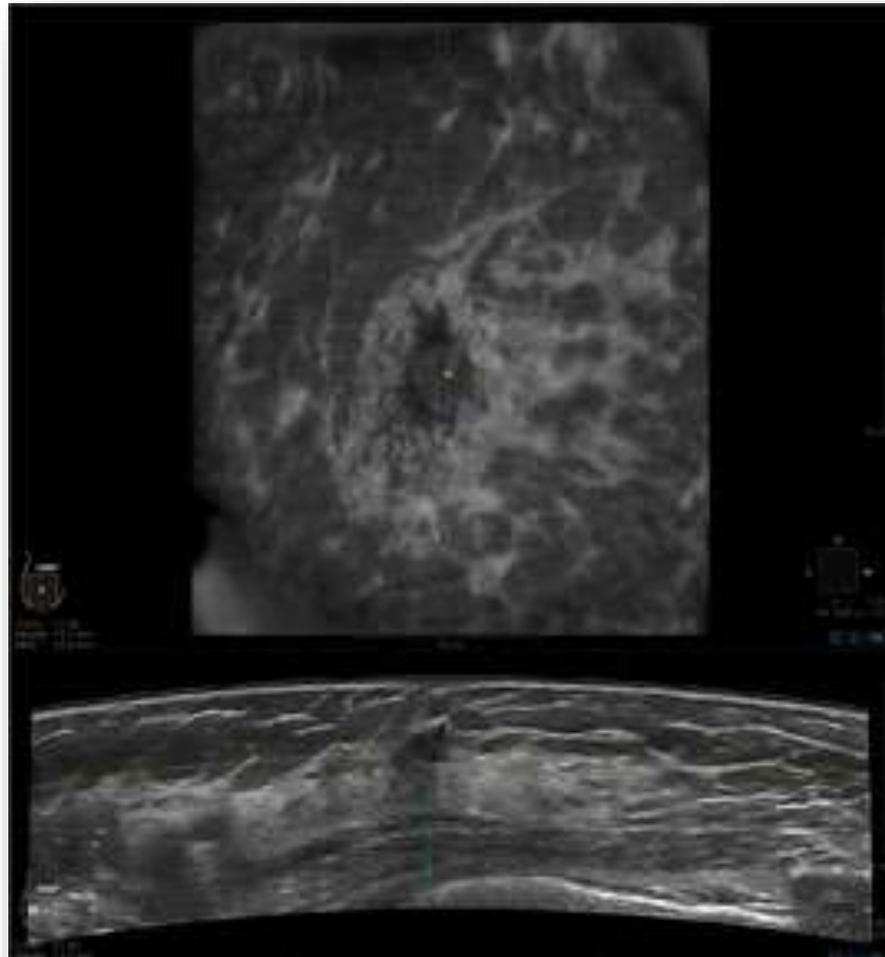
Automated Breast Ultrasound



Automated Breast Ultrasound



Automated Breast Ultrasound



Clinical Value of Additional Testing?

▶ Digital Breast Tomosynthesis

- ▶ Early results show 15% increase in cancer detection rate
- ▶ Reduced call back rate by 30%

▶ Screening Breast Ultrasound

- ▶ Kolb et al. Radiology 2002: Increased breast cancer detection rate by 13%
- ▶ ACRIN 6666 JAMA 2008: Increased breast cancer detection rate by 28%
- ▶ Majority of research shows additional breast cancers were node-negative, early stage invasive cancer

▶ Dense Breast Patients

- ▶ F/U Study in Connecticut
- ▶ 30% Dense Breast patients received US
- ▶ Found 3-5 additional cancers in every 1000 women annually



Thank You!

joyce.grube@toshiba.com