

# Dense Breasts, Clear Decisions: Navigating Supplemental Screening Options with Confidence

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1

## Disclosures

I have no disclosures



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## Where I work: The University of Kansas Health System



### Supplemental breast imaging

- ✓ 3D MAMMOGRAM
- ✓ AUTOMATED BREAST ULTRASOUND (ABUS)
- ✓ BREAST ULTRASOUND – HANDHELD
- ✓ CONTRAST ENHANCED MAMMOGRAM (CEM)
- ✓ MRI – ABBREVIATED
- ✓ MRI – FULL



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## Learning Objectives

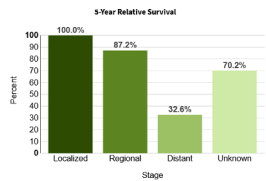
1. Understand the use of risk assessment and explore how breast density impacts cancer risk and mammographic sensitivity.
2. Review new FDA regulation for breast density reporting and notification.
3. Review updated breast cancer screening guidelines by risk status and tools available for supplemental screening.
4. Practice personalized screening through case review and learn how we can enhance cancer detection rates in women with dense breast tissue



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## Why screen?

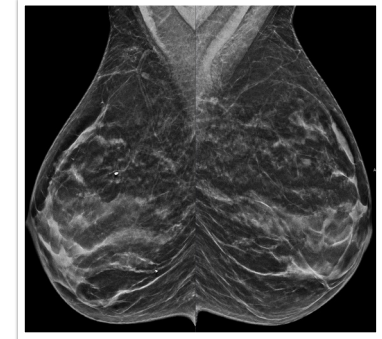


- Breast cancer is **most common** non-skin cancer in females
- Second most common cause of cancer deaths in females
- Breast cancer is treatable and **curable** when detected early
- Screening mammography has been repeatedly proven to reduce mortality by 30-40%



## Screening mammography

- Regulated by the FDA
- Majority of mammography is now digital breast tomosynthesis (DBT) or “3D”
  - 92% of accredited facilities now offer DBT (as of March 2025)



## How do we define risk?

- There is no single method or definition used to classify women into risk categories
- Typically defined by 3 categories:
  - Average (<15% lifetime risk)
  - Intermediate (15-20% lifetime risk)
  - High (>20% lifetime risk)
- Various risk models exist and most frequently estimate lifetime risk, but additional 5- and 10-year risk estimations may also be valuable for guideline development and informed decision-making
  - Most commonly used and comprehensive is Tyrer-Cusick

Often, intermediate and high risk referred to as “**elevated**” or “**higher-than-average**”



## Screening: Average risk (<15% lifetime)

Mammography Screening Guidelines in Average Risk Women		
Age (yrs) to Start Mammography	Age to Stop Mammography	Mammography Interval
ACR/SBI 40*	No age limit, tailor to individual health status	Annual
ACS 45, option to start at age 40	When life expectancy is < 10 years	Annual 45-54; Every 1 or 2 years 55+
ACOG 40	Age 75, then shared decision making	Every 1 or 2 years
AMA 40	Not Stated	Annual
ASBR 40	When life expectancy is < 10 years	Annual
NCCN 40	Age 75, then shared decision making	Annual
USPSTF 40	74 years	Every 2 years ©DenseBreast-Info.org Rev. Oct 2024

\*Black, Hispanic, and Asian women have peak incidence of breast cancer in their 40s and should begin screening at least by age 40 [1, 2]



## Screening: *Higher-than-average risk*

- What is higher-than-average?
  - Anyone who has any risk factor, now including dense tissue only
- When, where and by whom is risk assessed?
  - Informally, by:
    - PCP offices
    - Breast imaging intake forms at time of exam
  - Formally, by established high risk/breast cancer prevention clinics, if a patient is correctly referred
- Can include questionnaires on patient and family history, or input into various risk assessment tools
- Ideally, we are performing risk assessment by 25-30



## Screening: *High risk (>20% lifetime)*

- Commonly agreed upon criteria<sup>4</sup>:
  - Genetic mutations (BRCA, PALB2, CHEK2, etc) and first-degree untested relatives
  - Chest/abdominal radiation greater than 10Gy prior to age 30
  - Calculated lifetime risk >20% based on family history
- And the recommendation is?
  - MRI (in addition to annual mammogram)
    - Starting age varies by risk factor, though never before 25
  - MRI is validated to reduce both interval cancers and improve the incidence of late-stage disease



## What does the appropriateness criteria say?

Variant 3: Adult female 30 years of age or older. Breast cancer screening. High risk.		
Procedure	Appropriateness Category	Relative Radiation Level
Digital breast tomosynthesis screening	Usually Appropriate	☐☐
Mammography screening	Usually Appropriate	☐☐
MRI breast without and with IV contrast	Usually Appropriate	○
MRI breast without and with IV contrast abbreviated	Usually Appropriate	○
US breast	May Be Appropriate	○
Mammography with IV contrast	May Be Appropriate	☐☐
MRI breast without IV contrast	Usually Not Appropriate	○
MRI breast without IV contrast abbreviated	Usually Not Appropriate	○
Sestamibi MBI	Usually Not Appropriate	☐☐☐

Variant 4: Adult female younger than 30 years of age. Breast cancer screening. High risk.		
Procedure	Appropriateness Category	Relative Radiation Level
MRI breast without and with IV contrast	Usually Appropriate	○
MRI breast without and with IV contrast abbreviated	Usually Appropriate	○
US breast	May Be Appropriate	○
Digital breast tomosynthesis screening	May Be Appropriate	☐☐
Mammography screening	May Be Appropriate	☐☐
Mammography with IV contrast	Usually Not Appropriate	☐☐
MRI breast without IV contrast	Usually Not Appropriate	○
MRI breast without IV contrast abbreviated	Usually Not Appropriate	○
Sestamibi MBI	Usually Not Appropriate	☐☐☐



## Screening: *Intermediate risk (15-20% lifetime)<sup>4</sup>*

- Personal history of breast cancer
  - If diagnosed before age 50, or dense breast tissue:
    - **Annual MRI**
- Personal history of atypia (ADH, ALH, LCIS):
  - **Consider MRI** if other risk factors are present
- Dense breast tissue
  - **Annual MRI**
  - Consider CEM or ultrasound as alternative

ORIGINAL ARTICLE • Clinical Practice Management

**Breast Cancer Screening for Women at Higher-Than-Average Risk: Updated Recommendations From the ACR**

Debra L. Monticciolo, MD<sup>1</sup>, May S. Newell, MD<sup>2</sup>, Linda May, MD<sup>3</sup>, Cindy S. Lee, MD<sup>4</sup>, Stamatia V. Giannoutsos, MD<sup>5</sup>

**Abstract**

Early detection decreases breast cancer death. The ACR recommends annual screening beginning at age 40 for women at average risk and earlier and/or more intensive screening for women at higher-than-average risk. For women at higher-than-average risk, the recommended screening method of choice is breast MRI. Women with genetically inherited risk, those with calculated lifetime risk of 20% or more, and those exposed to chest radiation at young age are recommended to undergo MRI surveillance starting at age 25 to 30 and annual mammography (with or without screening ultrasound) starting at age 30. For women with a personal history of breast cancer, MRI surveillance should begin at age 6 months after breast MRI. Women with personal history, and those with atypia or dense breasts, should strongly consider MRI screening, especially if other risk factors are present. For women with dense breasts who have experienced screening breast MRI, mammography is recommended. For those who qualify for the average-risk breast MRI, mammography or abbreviated MRI screening could be considered. All women should undergo risk assessment by age 25, especially those women and women of African descent living in the United States. Appropriate imaging risk can be identified and appropriate screening initiated.


**Key Words:** Breast cancer screening; breast cancer; high-risk populations; breast MRI; breast cancer risk assessment

J Gen Intern Med 2023;38(9):1314. Copyright © 2023 American College of Physicians



Table 2. Comparison of updated with prior ACR recommendations [7]

Population at Risk	Prior Recommendation (2018) (Starting Age)	Current Recommendation (2023) (Starting Age)
Genetic mutation carriers/untested first-degree relatives	<ul style="list-style-type: none"> <li>Annual DM ± DBT (age 30)</li> <li>BRCA1 only DM ± DBT exception</li> <li>Annual MRI (age 25-30)</li> </ul>	<ul style="list-style-type: none"> <li>Annual DM ± DBT (age 40 if annual MRI; age 30 if not)</li> <li>Annual MRI (25-30 y)</li> </ul>
Calculated lifetime risk of ≥20%	<ul style="list-style-type: none"> <li>Annual DM ± DBT</li> <li>Annual MRI (Age 30)</li> </ul>	<ul style="list-style-type: none"> <li>Annual DM ± DBT</li> <li>Annual MRI (Age 30)</li> </ul>
History of chest/abdominal radiation treatment at a young age	<ul style="list-style-type: none"> <li>Annual DM ± DBT</li> <li>Annual MRI (Age 25 or 8 y after treatment, whichever is later)</li> </ul>	<ul style="list-style-type: none"> <li>Annual DM ± DBT</li> <li>Annual MRI</li> <li>Consider abdominal RT that overlaps breast in risk (Age 25 or 8 y after treatment, whichever is later)</li> </ul>
PH of breast cancer before age 40	<ul style="list-style-type: none"> <li>Annual DM ± DBT</li> <li>Annual MRI if dense breasts or if diagnosed before age 50; others with PH consider MRI (From age at diagnosis)</li> </ul>	<ul style="list-style-type: none"> <li>Annual DM ± DBT</li> <li>Annual MRI if dense breasts or if diagnosed before age 50; others with PH consider MRI (From age at diagnosis)</li> </ul>
History of atypia/LCIS diagnosed before age 40	<ul style="list-style-type: none"> <li>Annual DM ± DBT</li> <li>Consider annual MRI if other risk factors (From age at diagnosis)</li> </ul>	<ul style="list-style-type: none"> <li>Annual DM ± DBT</li> <li>Consider annual MRI if other risk factors (From age at diagnosis)</li> </ul>
Dense breast tissue	<ul style="list-style-type: none"> <li>Annual DM ± DBT</li> <li>Consider annual MRI or ultrasound (Age 40 or earlier if other risk factors)</li> </ul>	<ul style="list-style-type: none"> <li>Annual DM ± DBT</li> <li>Annual MRI</li> <li>Consider CEM or ultrasound as alternative to MRI (Age 40 or earlier if other risk factors)</li> </ul>
All women, especially Black, minority, and those of Ashkenazi Jewish descent	Risk assessment by age 30	Risk assessment by age 25



13

## Increasing risk in younger generations

- In the US, the rate of cancer diagnosed under 40 increased 35.4% from 1975 to 2019<sup>6</sup>
- Headline from The Lancet Public Health in July 2024 found incidence rates rose in successively younger generations (particularly Gen X and Millennials) in 17 of 34 cancer types – including breast<sup>7</sup>
- Suspected risk factors: increases in carcinogenic exposures during early life, as well as obesity, diet, altered sleep patterns, environmental chemicals
- What can we do?
  - These generations will be increasingly reach screening age - we need to be armed and prepared with the tools and recommendations to screen them appropriately

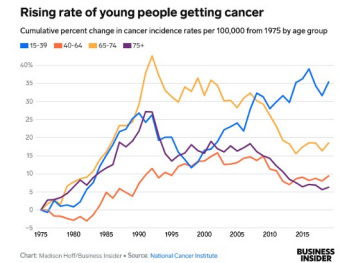



Chart: Madison Hoff/Business Insider • Source: National Cancer Institute




6. Accessed at: [www.cancer.gov](http://www.cancer.gov)  
7. Sung, 2024

14

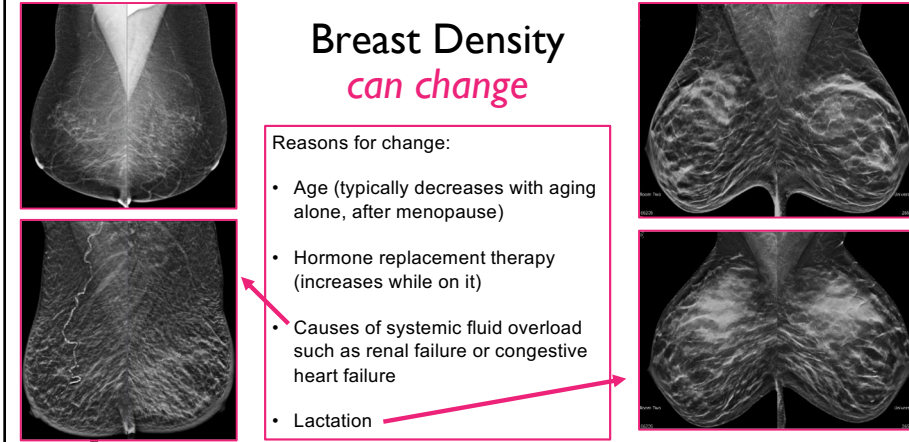
## Defining Breast Density

- What is breast density?
  - The amount of fibroglandular tissue relative to fatty tissue
- How is it determined?
  - By a radiologist visually on a mammogram
  - Additional tools: AI software
- Breast density is unique to each patient and can change over time




15

## Breast Density can change



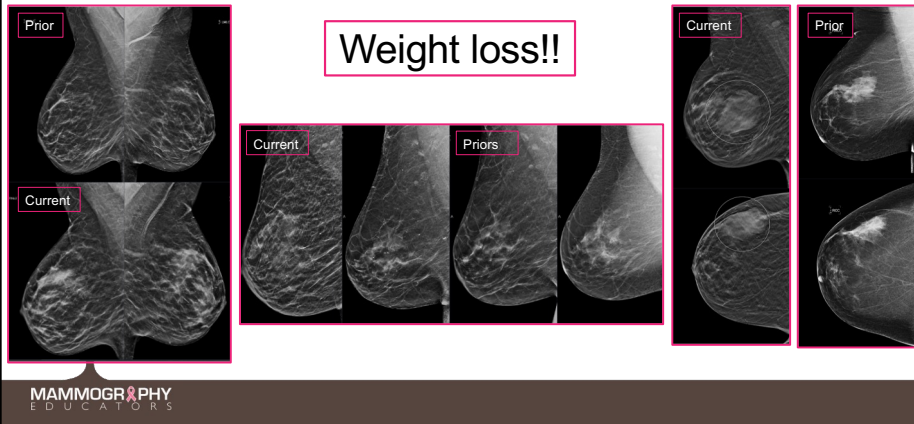
Reasons for change:

- Age (typically decreases with aging alone, after menopause)
- Hormone replacement therapy (increases while on it)
- Causes of systemic fluid overload such as renal failure or congestive heart failure
- Lactation



16

But what is the **biggest** culprit of density change?



17

How can YOU help?

- Technologists play a major role in our success
- Obtaining (and documenting) accurate histories to determine potential causes of mammographic change can help prevent recalls
  - Ask about weight change
  - Ask about interval surgery
  - Ask about the use of HRT



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## Defining Breast Density

- American College of Radiology (ACR) BI-RADS four categories of breast composition:
  - a) The breasts are almost entirely fatty.
  - b) There are scattered areas of fibroglandular density.
  - c) The breasts are heterogeneously dense, which may obscure small masses.
  - d) The breasts are extremely dense, which lowers the sensitivity of mammography.



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19

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NOT  
DENSE



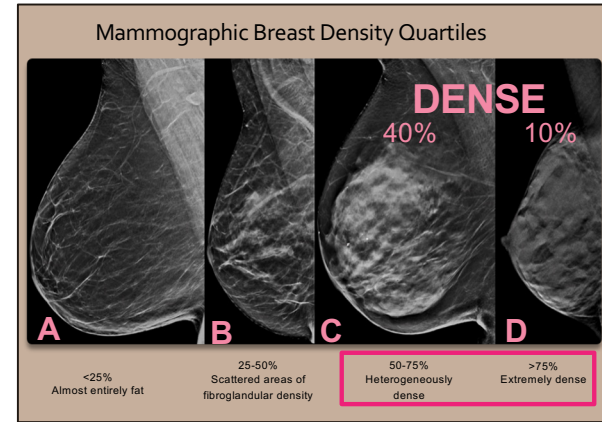
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20

## Defining Breast Density

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  - The breasts are extremely dense, which lowers the sensitivity of mammography.

DENSE



## What is the significance?

- Breast cancer is common and contributes to morbidity and mortality
- Early detection from regular screening substantially reduces breast cancer mortality<sup>1</sup>
  - Screening identifies cancers when they are smaller with fewer nodal metastases
  - Patients are less likely to require mastectomy or chemotherapy, reducing morbidity
- Gold standard for breast cancer screening = mammography
- There are limitations
  - Reduced sensitivity in certain populations
    - Dense breast tissue<sup>2</sup>

Why is this?  
1) Masking  
2) Independent risk factor



## What is the significance?

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- There are limitations
  - Reduced sensitivity in certain populations
    - Dense breast tissue<sup>2</sup>
    - Elevated risk

Our first line imaging modality is the **least effective** in screening the population at highest risk!



## New FDA Mandated Breast Density Language

- Beginning **September 10, 2024**, mammography facilities must provide **ALL** patients receiving a mammogram with one of two federal breast density statements which cannot be altered
- Applies to **ALL** mammograms
  - Post-procedure mammogram, patients with known cancer, all genders/ages

**If NOT DENSE:** "Breast tissue can be either dense or not dense. Dense tissue makes it harder to find breast cancer on a mammogram and also raises the risk of developing breast cancer. Your breast tissue is not dense. Talk to your healthcare provider about breast density, risks for breast cancer, and your individual situation."

**If DENSE:** "Breast tissue can be either dense or not dense. Dense tissue makes it harder to find breast cancer on a mammogram and also raises the risk of developing breast cancer. Your breast tissue is dense. **In some people with dense tissue, other imaging tests in addition to a mammogram may help find cancers.** Talk to your healthcare provider about breast density, risks for breast cancer, and your individual situation."



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## So, what do we do about it?

Full protocol MRI  
Abbreviated MRI  
Handheld ultrasound  
Contrast enhanced mammography  
Automated ultrasound  
Molecular breast imaging



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## Supplemental Screening

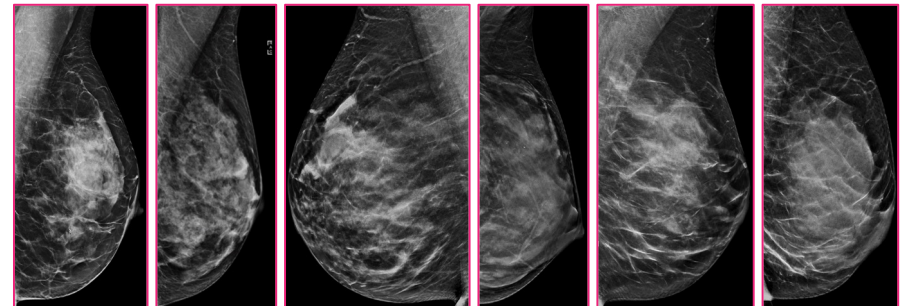
- Each supplemental screening option has unique advantages and limitations
- Local/institutional availability varies
- They are intended to be used in conjunction with annual screening mammography



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27

## All of these patients have 2 things in common:



1. Dense breast tissue

2. Cancer in the breast shown



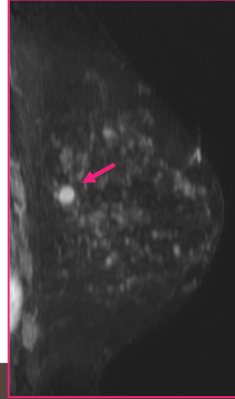
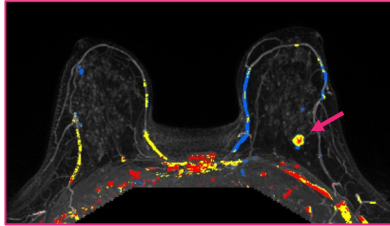
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28

## Case: 42-year-old with BRCA1 mutation

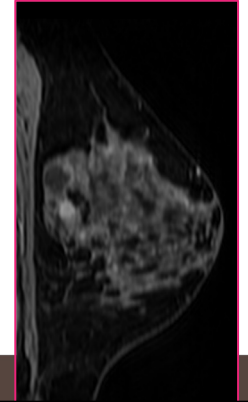
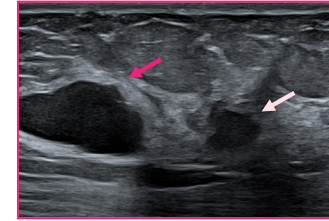
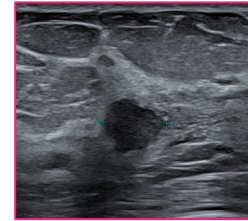


- This patient's lifetime risk is >60%, putting her in the high-risk category
- Annual MRI is recommended



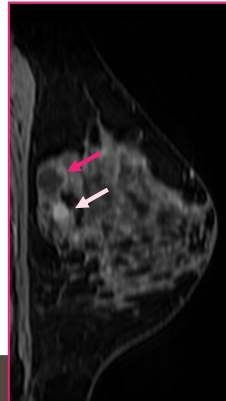
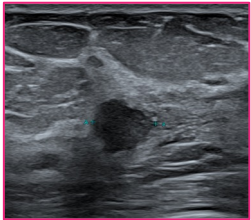
29

## Case: 42-year-old with BRCA1 mutation



30

## Case: 42-year-old with BRCA1 mutation



Pathology:  
Grade 3  
invasive  
ductal  
carcinoma



31

## Full Protocol Breast MRI

### Advantages

- Highest sensitivity (finds the most cancers!)
- No ionizing radiation
- Most inclusive field-of-view and anatomic detail

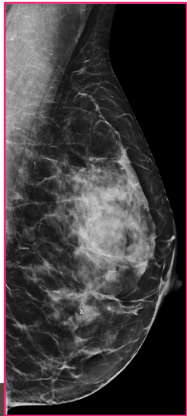
### Limitations

- Often more expensive
- Sometimes not well tolerated (30+ minute exam time)
- Use of gadolinium contrast
- Patient limitations: claustrophobia, size/weight restrictions, implanted devices



32

**Case:** 54-year-old initially presented for screening mammogram



- Technologist accurately entered family history, and Tyrer-Cusick lifetime risk was 28%
- Radiologist put information about the high-risk clinic in the report
- Patient was seen in high-risk clinic where she was diagnosed with CHEK2 genetic mutation
- This patient had a brain MRI recently which lasted 30 minutes and she didn't think she could tolerate doing that again – what are her options?

33

**Options for screening breast MRI**

- Traditional **“Full Protocol”** breast MRI
  - Typically around 30 min of scan time
  - Scheduled in a longer slot (45 min)
  - Multiple post-contrast series which allow for kinetic data
- **“Abbreviated”** breast MRI
  - No established protocol at this time
  - Shortened exam, typically reduces the number of post contrast series and additional sequences
  - Can be as short as 5 minutes or less, scheduled in time slots ranging from 15-25 minutes
- Both exams require IV gadolinium

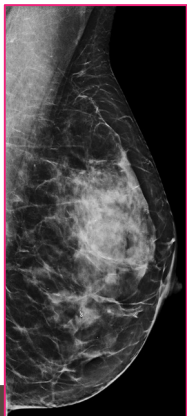


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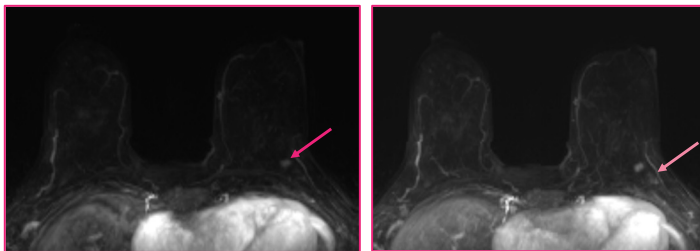
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34

**Case:** 54-year-old initially presented for screening mammogram

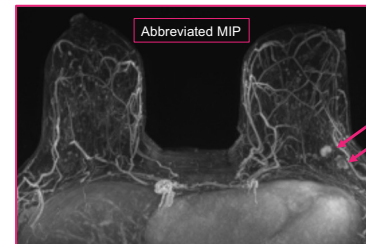


- Technologist accurately entered family history, and Tyrer-Cusick lifetime risk was 28%, later diagnosed with CHEK2 genetic mutation
- Patient opts for **ABBREVIATED MRI**

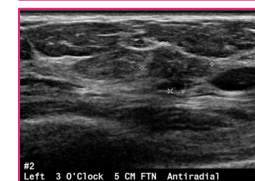


35

**Case:** 54-year-old initially presented for screening mammogram



**Pathology:** Grade 2  
invasive ductal  
carcinoma



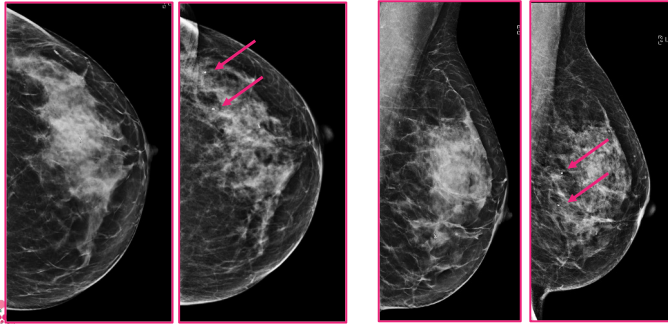
**Pathology:** Grade 2  
invasive lobular  
carcinoma



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**Case:** 54-year-old initially presented for screening mammogram



Post-procedure mammogram- even in retrospect, these cancers are not visible!



## Abbreviated Breast MRI

### Advantages

- High sensitivity, no significant difference from full protocol
- No ionizing radiation
- Most inclusive field-of-view and anatomic detail
- Usually less expensive than full protocol
- Better tolerated

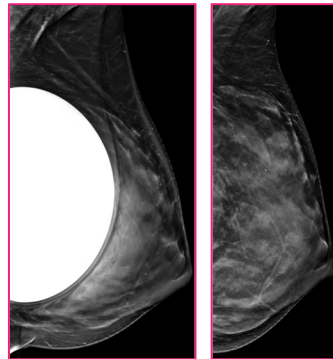
### Limitations

- Use of gadolinium contrast
- Patient limitations: claustrophobia, size/weight restrictions, implanted devices



**Case:** 40-year-old presents for baseline mammogram

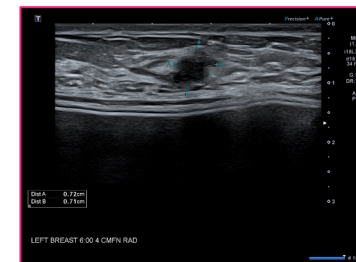
- 40-year-old patient who presents for baseline screening and finds out she has extremely dense breast tissue
- She desires supplemental screening but is very risk-averse – does not want an IV
- Also – she has implants



**Case:** 40-year-old presents for baseline mammogram

- What can we offer her? →

Handheld ultrasound screening



Pathology at ultrasound-guided biopsy: Grade 2 IDC



## Handheld Ultrasound

### Advantages

- Widely available
- Short interpretation time
- Often lower cost
- No radiation or IV contrast

### Limitations

- Very operator dependent, requires training to reduce false positives
- High false positive rate, lower cancer detection rate
- May require over-scan by radiologist

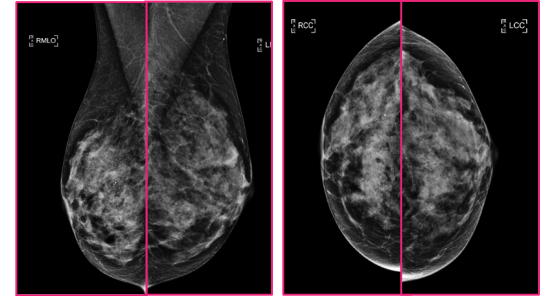


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## Case: 78-year-old with dense tissue

- Normal screening mammogram, dense tissue
- She desires supplemental screening but does not want an IV
- What are her options?



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## Case: 78-year-old with dense tissue

- What is recommended?
  - Technically, MRI
    - We do commonly screen patients >75 years old with MRI
  - CEM – still has an IV
  - Ultrasound would be a great option for this patient!

Women should continue screening mammography as long as they remain in overall good health and are willing to undergo the examination and subsequent testing or biopsy, if an abnormality is identified.



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43

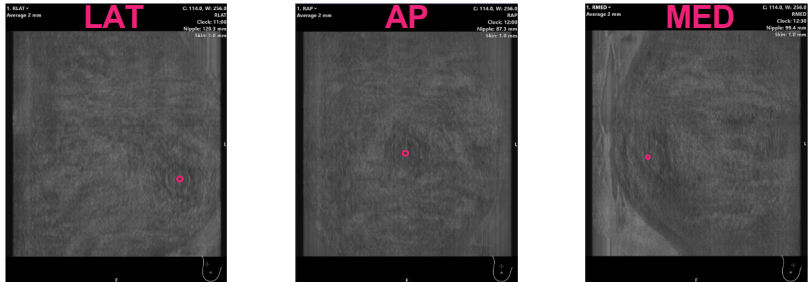
## What is automated ultrasound?

- Breast ultrasound utilizing unique probes which allow for more standardized imaging of the entire breast
- User-independent
- Allows for easier remote reading by a radiologist
- More reproducible and improved temporal comparison



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**Acquisition**

- Standard examination includes 3 data sets per breast
- Anteroposterior (AP)
- Lateral (LAT)
- Medial (MED)
- Additional views may be necessary: superior, inferior, extra views
- Scan depth and nipple location are manually selected

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### Why are 3 views important?

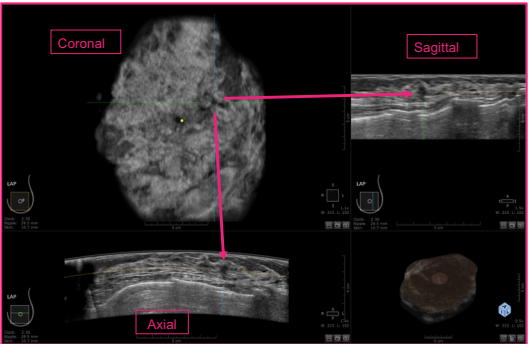
- Cancers may only be visualized in one view, similar to mammography



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46

### Case 3: 78-year-old with dense tissue

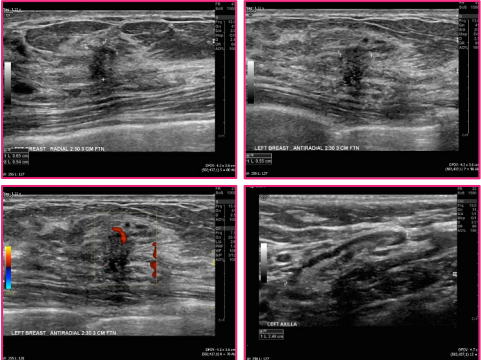


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### Case: 78-year-old with dense tissue

Pathology: Grade 2 invasive ductal carcinoma



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## Ultrasound – in general

### Advantages

- Well tolerated
- Widely available
- No IV contrast or radiation
- Sometimes cheaper

### Limitations

- Lowest cancer detection rate
- Highest false positives
- Operator dependent – varies based on type



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## Case: 58-year-old with dense tissue

- 58-year-old patient with dense breast tissue receives her mammogram report in the mail with the new FDA mandated breast density reporting and she has dense tissue
- She does not live near an imaging center and even the closest one does not offer anything except traditional mammography
- Is there another option??



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50

## Another option: ATUSA

- Reproducible whole breast ultrasound imaging with 3D technique
- Obtained at the point of care, no trained operator
- Full automated, hands-free scanning, 2 min per breast

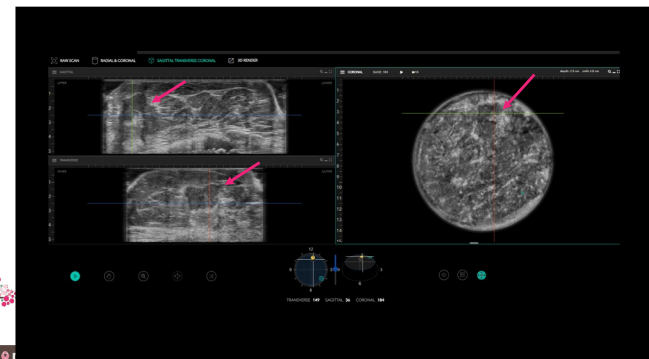


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51

## Case: 58-year-old with dense tissue

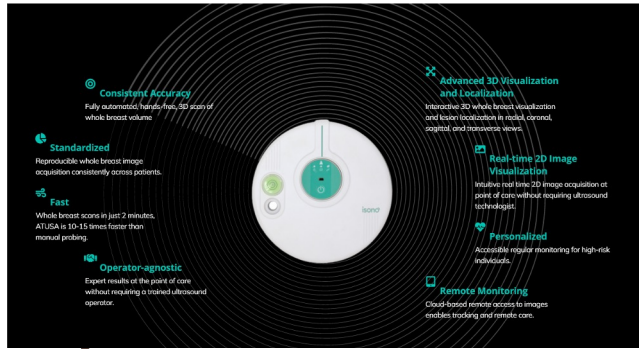
Pathology: Invasive ductal carcinoma



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52

## ATUSA automated breast ultrasound



1. Fully automated
2. Reproducible images (similar to conventional AUS)
3. Shorter scan time – 2 minutes
4. Does not require trained ultrasound operator
5. Reconstructed 3D views
6. Cloud-based remote access

## Automated vs. Handheld Ultrasound Screening

### Handheld

- Widely available
- Operator dependent
- Reader relies on technologist for findings, may need to overscan
- Potential findings and recalls are assessed in one study, which can lead to inefficiencies
- Real-time evaluation of difficult locations (axilla, subareolar, far medial or lateral)

### Automated

- Accessibility varies
- No mandated operator training, mammography technologists and medical assistants can perform
- Allows reader to assess symmetry, bilaterality and multiplicity of findings
- Usually interpreted as a screening examination (BR 0, 1 or 2)- thus can be interpreted remotely
- Does not reliably see difficult locations



## Case: 45-year-old with dense tissue and personal history of breast cancer at age 38

- Per chart review, the patient was lost to follow up and did not tolerate MRI well
- Given personal history prior to age 50 and dense breast tissue, this patient is considered high-risk
- What else can we offer this patient?



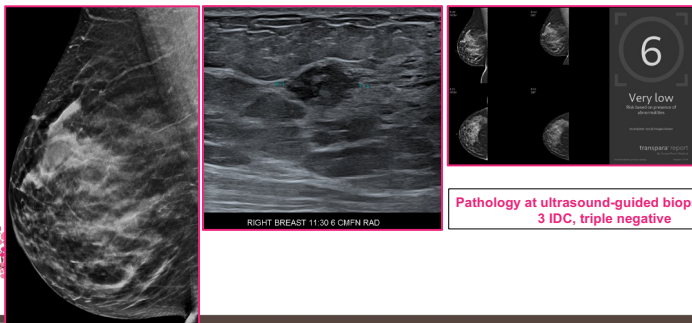
Case: 45-year-old with dense tissue and personal history of breast cancer at age 38

What else can we recommend?

CEM



**Case:** 45-year-old with dense tissue and personal history of breast cancer at age 38



Pathology at ultrasound-guided biopsy: Grade 3 IDC, triple negative



57

## Contrast Enhanced Mammography

### Advantages

- Similar sensitivity to MRI, and possibly better specificity
- Short exam time (10 minutes)
- Well tolerated
- Usually lower cost than MRI

### Limitations

- Use of iodinated contrast (limited in patients with kidney disease or allergy)
- Uses radiation (though dose is comparable to DBT)
- Field-of-view limited
- Biopsy not widely available



58

**Case:** 55-year-old with TC lifetime risk of 38%

- 55-year-old patient with a family history of breast cancer (TC 38%) who is claustrophobic and has poor kidney function, though still desires a supplemental screening option with a high cancer detection rate
- Is there another option?



59

**Case:** 55-year-old with TC lifetime risk of 38%

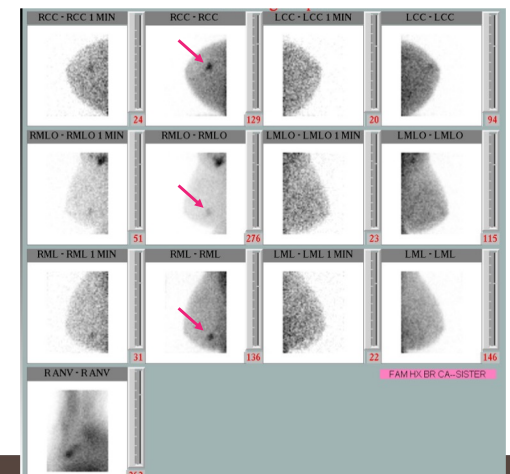
What else can we recommend?

MBI

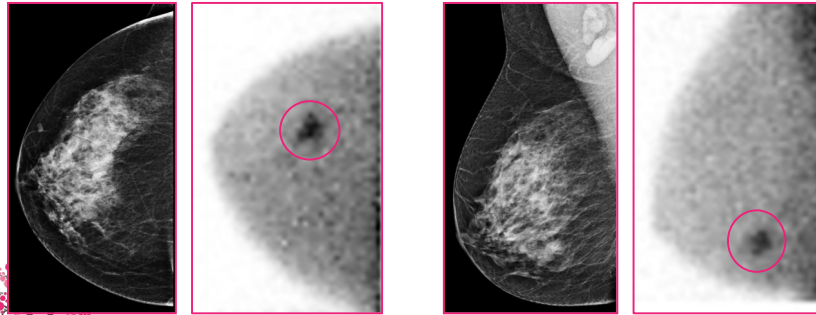
- Standard CC and MLO views like traditional screening mammography
- Each image with the gamma camera takes about 10 minutes



60



## Case: 55-year-old with TC lifetime risk of 38%



Pathology: Grade 2 invasive ductal carcinoma

## Molecular Breast Imaging

### Advantages

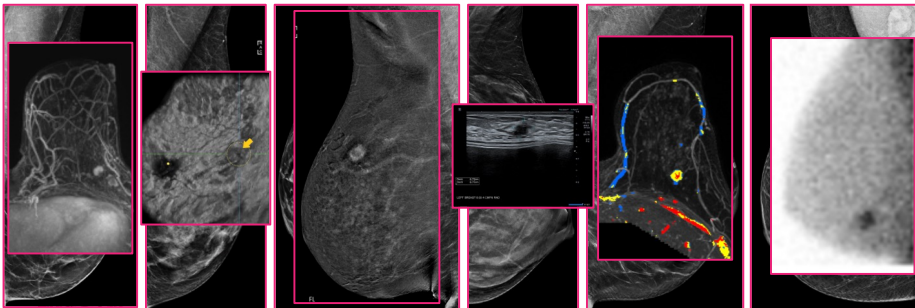
- High cancer detection rate similar to MRI and CEM
- Does not use iodine or gadolinium-based contrast
- Similar experience to traditional mammogram

### Limitations

- Not as accessible
- Whole body radiation dose
- Long exam time



## All of these patients have cancer:



## You are the first line!

- Most patients who present for screening mammograms and have dense tissue will not talk to a radiologist
- Primary care providers may not have time or appropriate education to explain the significance to patients



## So, what really is the cost?

- The affordable care act covers screening mammograms, but this is not extended to supplemental screening
- Several states do have laws in place requiring insurance coverage of supplemental screening exams which can be subject to deductibles and co-pays
- Both abbreviated MRI and CEM are newer exams which lack dedicated CPT codes, so billing is variable
- There is bi-partisan support for the Find It Early Act which would extend no-cost coverage to supplemental exams for dense breast and high-risk patients



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## Take Home Points

- Enter accurate histories
    - Identify patients at risk to help direct personalized screening
  - Understand the FDA mandated breast density language so you can explain at a patient level
  - Stay familiar with the current supplemental screening options that your facility offers
    - Know the basics about advantages and limitations, or where to refer for more questions
- If your facility offers educational material – have it handy!



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68