Breast Cancer Screening

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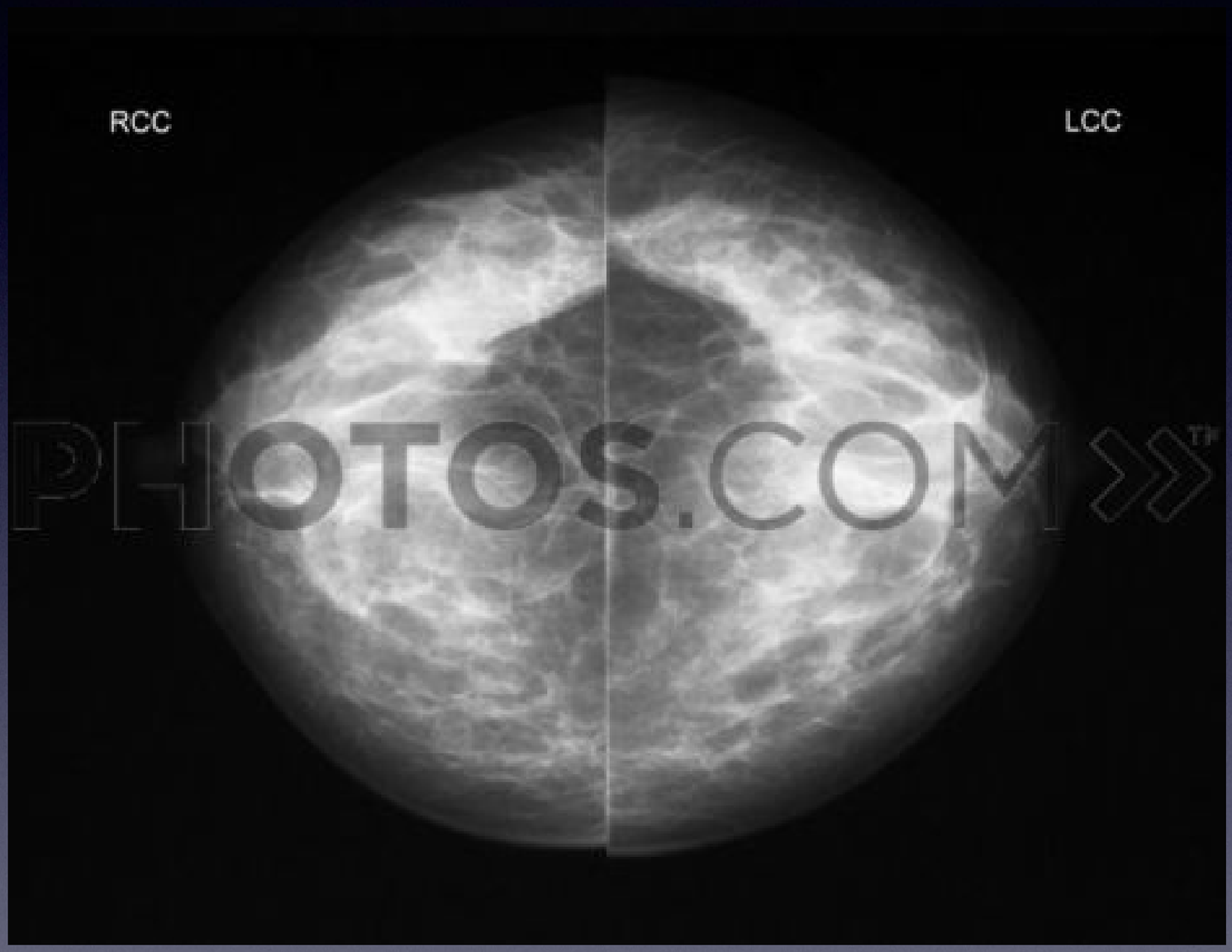
Outline

- Mammogram
  - Digital
  - 3-D mammogram
- Ultrasound
- MRI
- Diagnostic Workup
- Genetic Screening

Mammogram

- Xray of the breast
- Two Views
  - CC
  - MLO
- Calcifications, masses, asymmetry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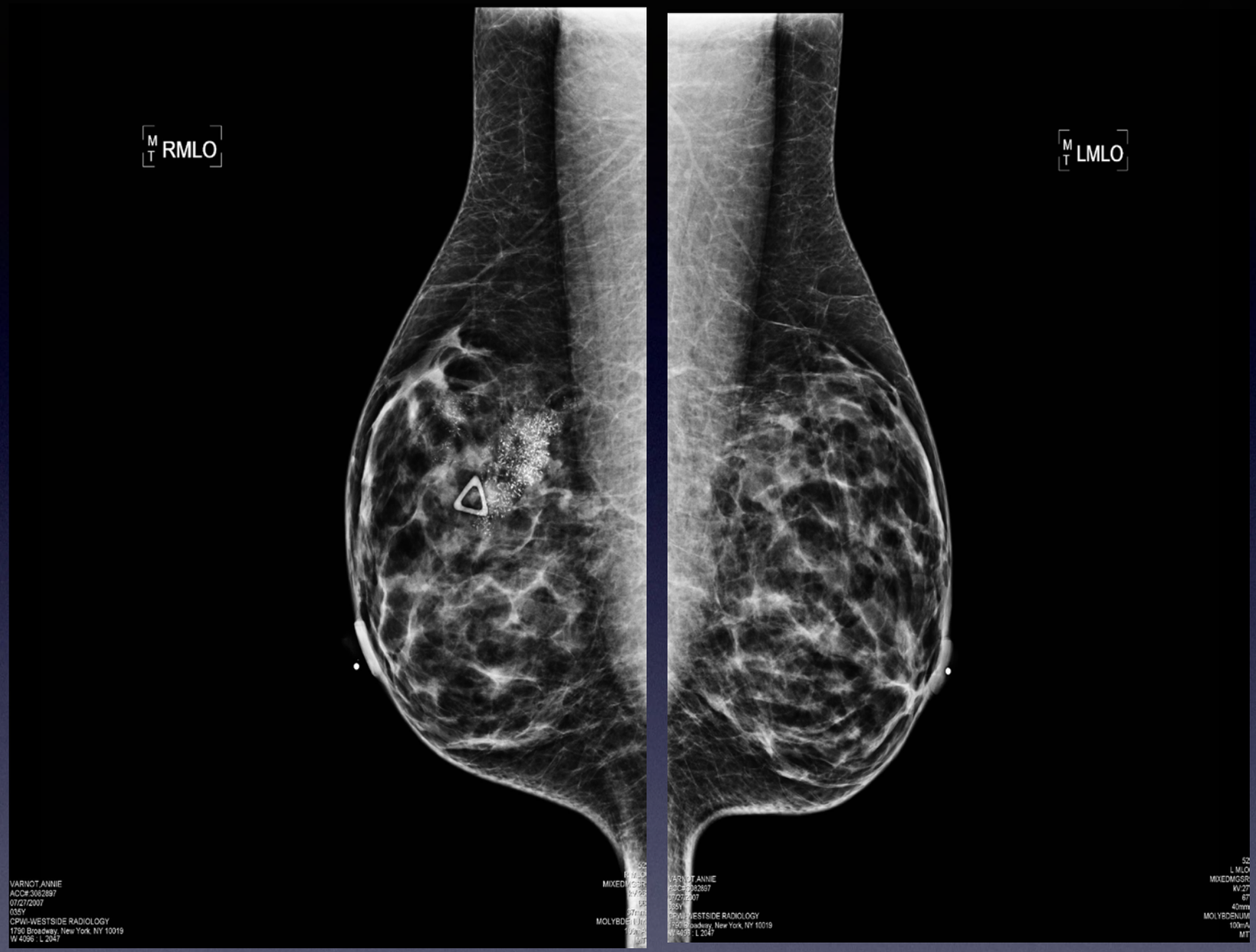
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Screening vs Diagnostic

- Screening
  - Asymptomatic

- Diagnostic
  - Symptomatic
    - palpable mass
    - nipple discharge
    - skin changes
    - breast pain
  - Additional views +/- Ultrasound
  - Radiologist views imaging

Radiation Exposure

- **Average radiation exposure per year**
  - 3msV
- **2 view mammogram**
  - 0.4msv
- **Comparable Exposure**
  - driving 300 miles
  - riding 10 miles on a bike
  - breathing 2 days of Boston air

- Induces 1-3 cancers/million patients

Effectiveness of Mammogram

- Sensitivity — 84%
  - True positive rate
- Specificity — 90.8%
  - True negative rate

- Recall Rate — 10%

- Cancers and PPV
  - 23%
    - number of screening exams and % of screening exams were biopsy was recommended that result in a cancer diagnosis

Breast Cancer Surveillance Consortium Benchmark

BI-RADS

BI-RADS Classification	Features
0	Need additional imaging
1	Negative – routine in 1 yr
2	Benign finding – routine in 1 yr
3	Probably benign, 6mo follow-up
4	Suspicious abnormality, biopsy recommended
5	Highly suggestive of malignancy; appropriate action should be taken

BI-RADs 0

- Needs additional imaging
- Old films
- additional views
- ultrasound

BI-RADs 3

- Short term follow-up
  –6 months

- Possible benign finding
  –Stability

- Management
  –Follow-up imaging
  –Repeat Clinical Breast Exam

BI-RADs 4

- 4A – low suspicion for malignancy
- 4B – intermediate suspicion for malignancy
- 4C – moderate concern (but not classic for malignancy)

BI-RADs 5

- >95% malignancy
- Classic presentation

Biopsy

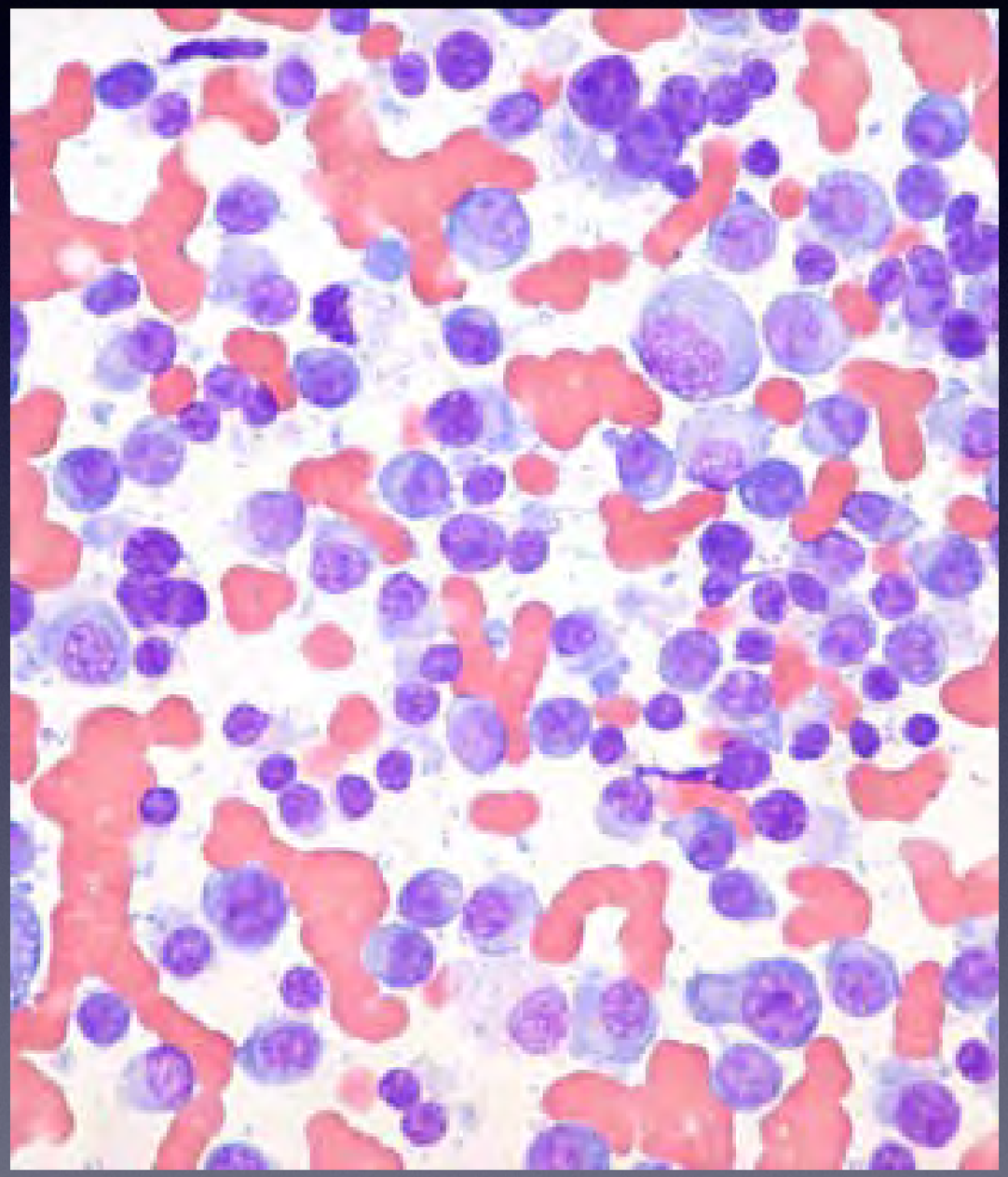
- Fine needle aspiration
  - –Cytology

- Core biopsy
  - –Image guided
  - –Stereotactic

- Excisional biopsy
  - –Surgery

Fine Needle Aspiration

- Fast, inexpensive
- 96% accuracy
- Institution dependent
- Benign vs. Malignant



Core Needle Biopsy

- Gauge spring loaded needle - vary in size
- Tissue
- Multiple

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IM#1 +0:08:03
4cm LA39
MLB BREAST
FROZEN
38G
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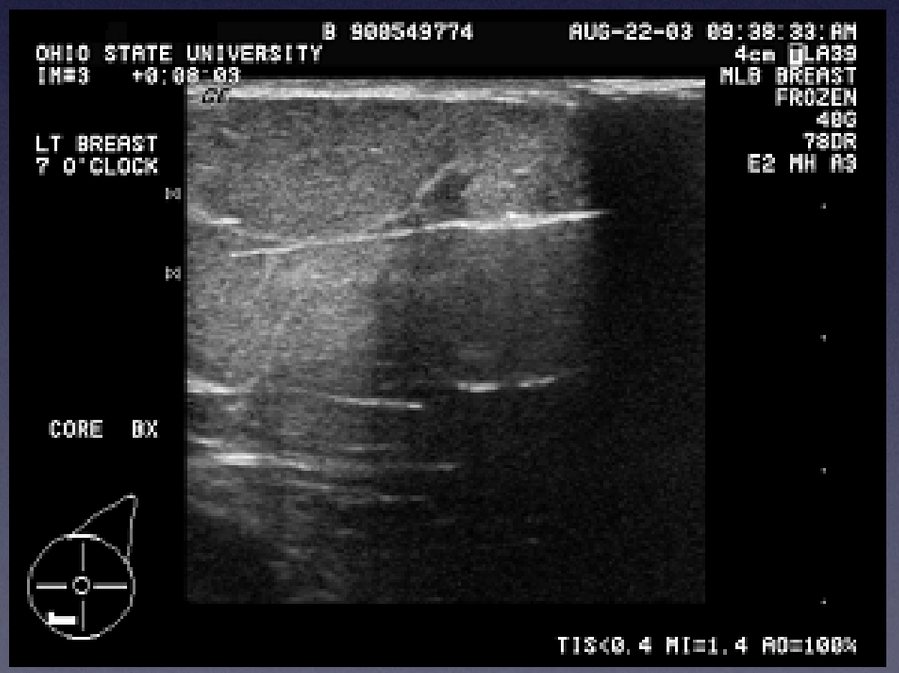
E2 MH A9
LT BREAST
7 O'CLOCK
CORE BX
TIS<0.4 MI=1.4 AO=100%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FROZEN
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CORE BX
TIS<0.4 MI=1.4 AO=100%

Vacuum-Assisted

- 6-14 gauge core
- Large samples
- Single insertion

Core Biopsy

Vacuum Assisted

Stereotactic Biopsy

- Suspicious mammographic abnormalities

- Patients lay prone

45
APR
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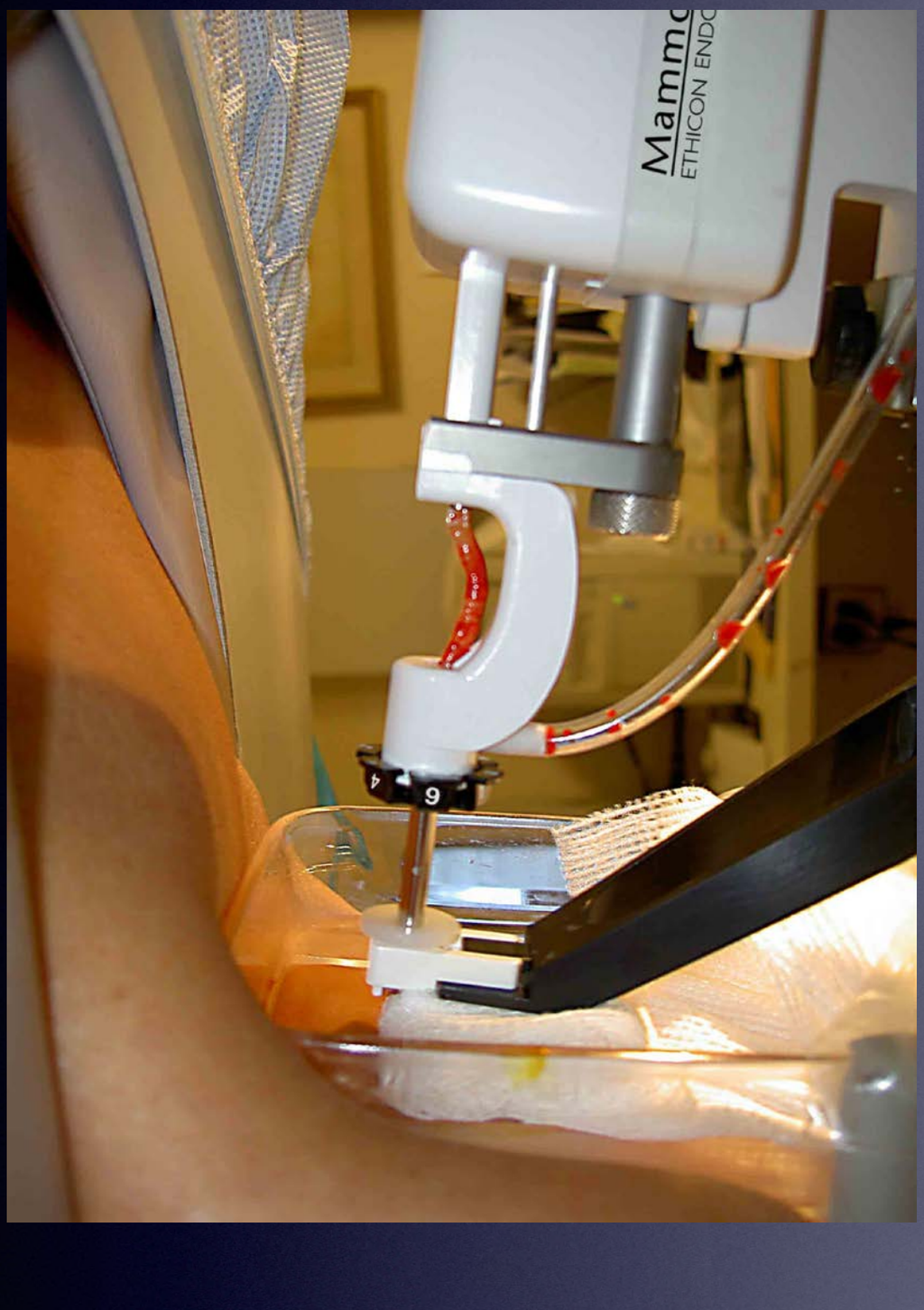
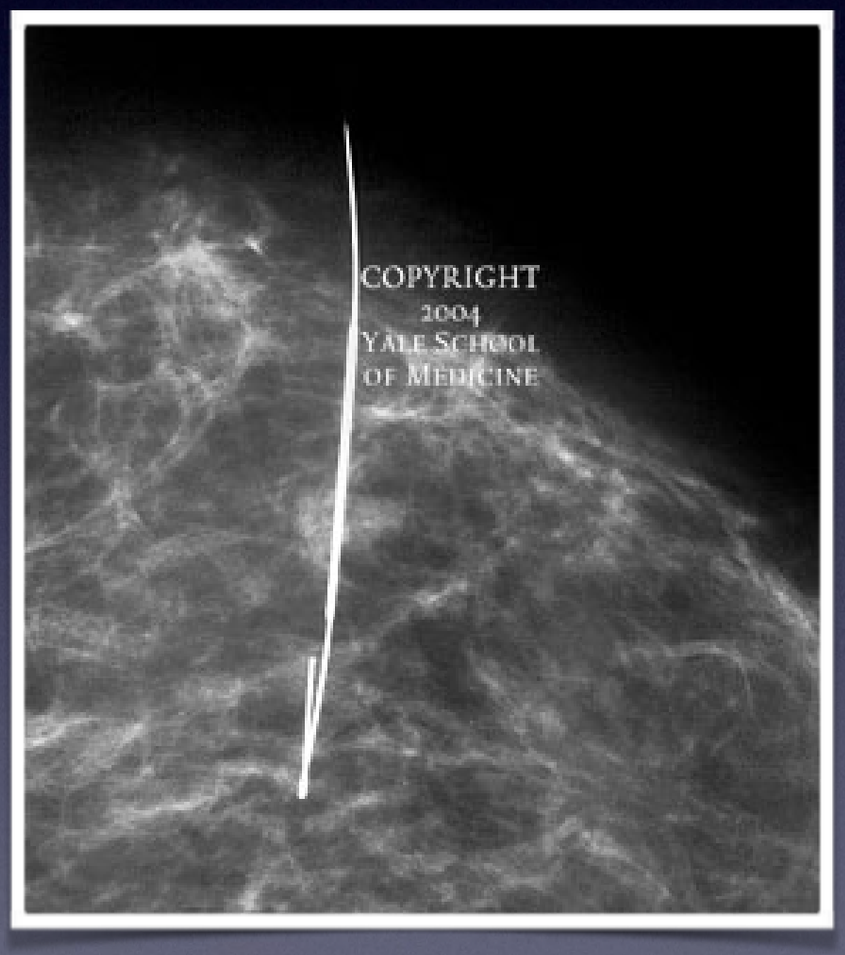
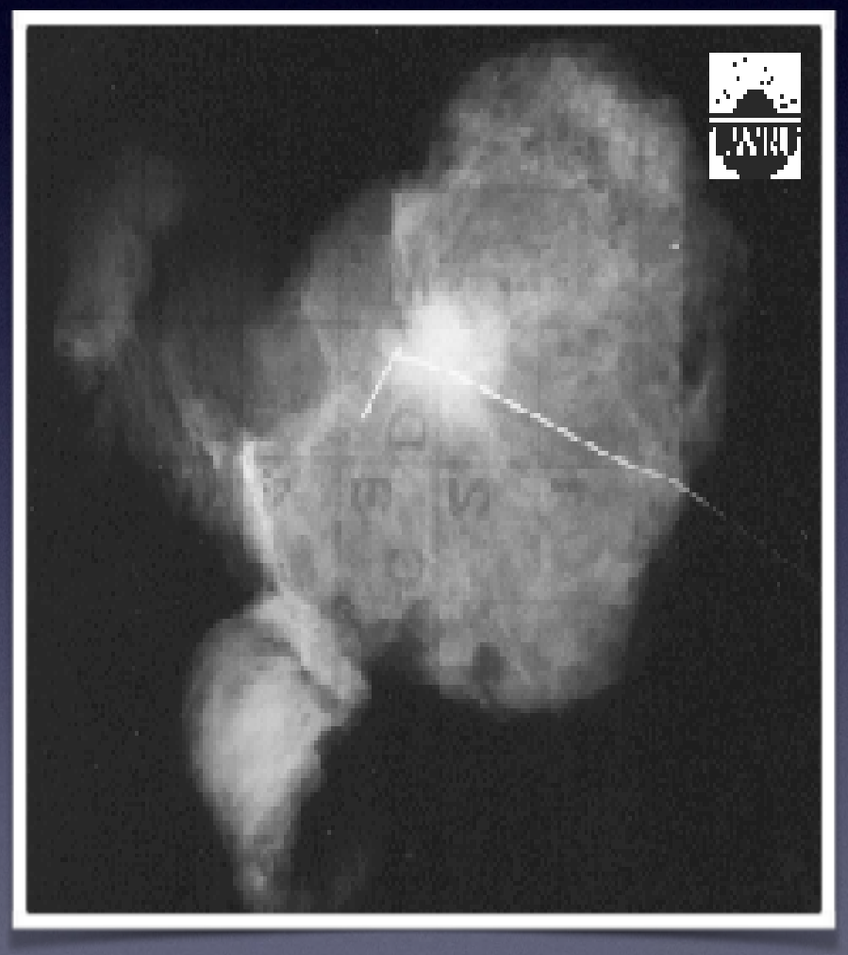

ETHICON

Excisional Breast Biopsy

- Surgical procedure
  - –Outpatient
- Removal of suspicious area

Needle Localization





Excisional Breast Biopsy

- Inability to do core needle biopsy
- Patient refuses needle biopsy
- Radiologic and pathologic discordance

Excisional Breast Biopsy

- Abnormal findings on needle biopsy
  - Atypical lesions
    - Atypical ductal hyperplasia
    - Atypical lobular hyperplasia*
    - Atypical papilloma
  - LCIS*
  - Papilloma
  - Radial scar
  - Phyllodes

Surgical Consult

- Abnormal findings on core biopsy
- Worrisome exam with normal imaging
- Unable to perform core biopsy

What to Bring…

- Imaging and reports
- Pathology reports

What to expect…

- Review HPI
- Review all imaging and pathology reports
- Review medical history
  - GYN history
  - Family History
  - History of prior breast biopsies
- Clinical Breast Exam

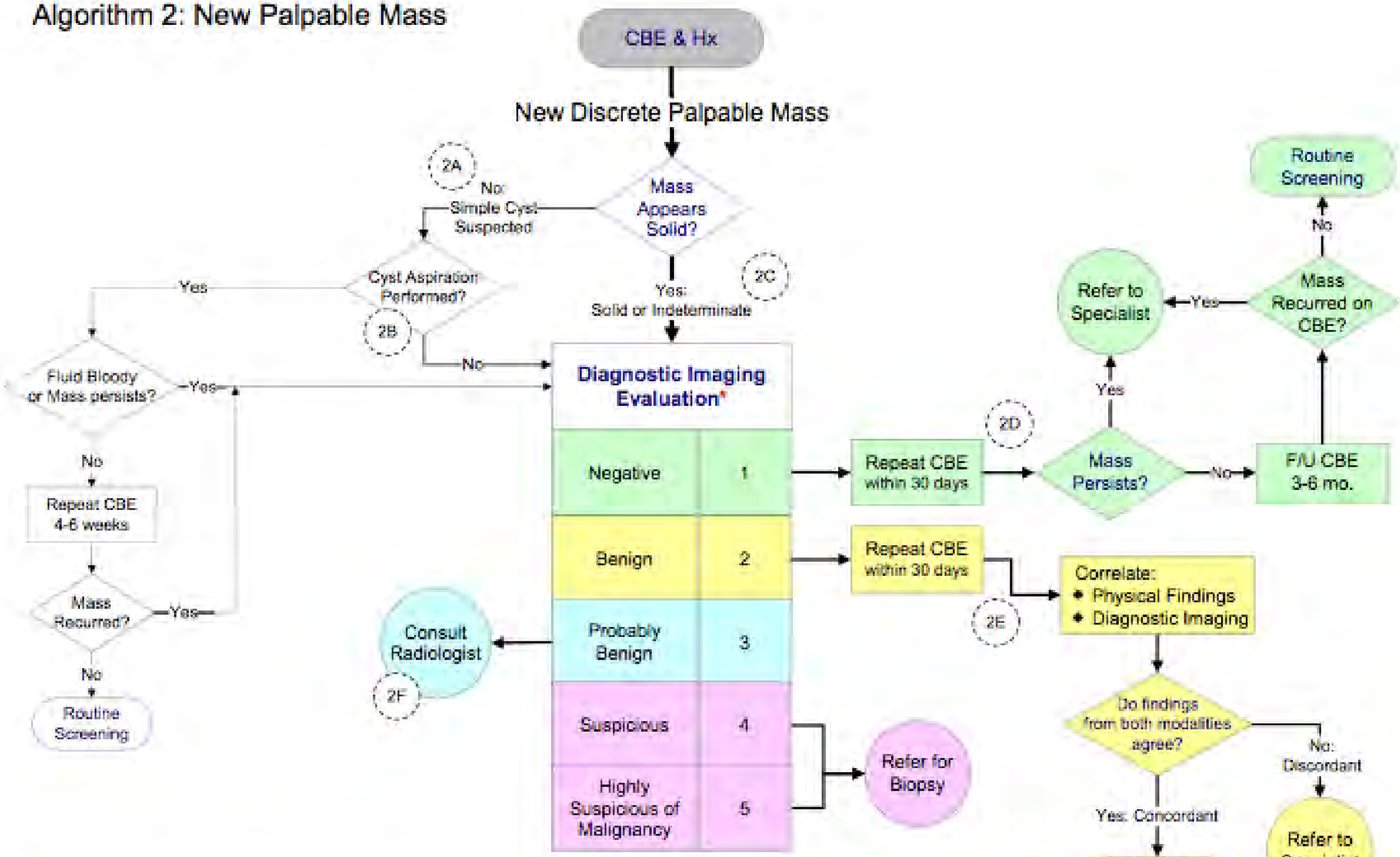
What to expect…

- Review pathology and symptoms
- Discuss surgery vs observation

Questions??

The work-up of a suspicious mass

Algorithm 2: New Palpable Mass



*Diagnostic Imaging Evaluation should be accompanied by standard screening mammography of both breasts if screening mammography has not been conducted within the recommended timeframe. Diagnostic Imaging Evaluation will often include diagnostic mammogram and breast ultrasound, but can also include any radiographic imaging procedure recommended by the radiologist. A final BI-RADS category will be assigned to the case based on the results of all diagnostic imaging procedures. Women should return to routine screening once the diagnostic and/or treatment cycle is completed.

Cyst

- Simple cyst
  - Benign finding
  - Does not require needle aspiration, only if symptomatic
  - Fluctuates with menstrual cycle

Worrisome Cyst

- Cyst
  - Persistent
    - Needs excision
  - Bloody aspiration
    - Needs excision
  - Rapid Recurrence
    - Needs excision

Solid Mass

- Solid mass
  - Biopsied
    - Needle Biopsy
    - Excisional biopsy
      - Patient unable to get needle biopsy
      - Refuses core biopsy
      - Not amenable for radiologic biopsy

Benign Findings

- Fibroadenoma
  - Observation
    - Imaging and clinical exam for 2 years twice a year
      - Increases in size needs excision
  - Excision

- Phyllodes
  - Excision

Fibrocystic Disease

- Histology
  - Adenosis
  - Apocrine metaplasia
  - Fibrosis
  - Duct ectasia
  - Mild ductal hyperplasia

Fibrocystic Disease

- Clinical, mammographic and histologic findings
- Exaggerated response from hormones and growth factors
  - Cyclical pain
  - Nodularity – upper outer quadrants

Discordant

- Clinical exam
  - Irregularity
  - Not seen on imaging
  - Refer to specialist

Nipple Discharge

- Physiologic
  - Bilateral
  - Non-spontaneous
  - Multiple ducts
  - Heme (-)

Nipple Discharge

- Pathologic
  - Unilateral
  - One duct
  - Clear, bloody
  - Spontaneous

- Workup
  - Imaging
  - Ductogram
  - Excision

Intraductal Papilloma

- Single duct
- Benign
- 4% of intraductal ca

Breast Imaging

Breast Ultrasound

- Sound Waves

- Adjunct to mammogram
  - palpable mass

- Solid vs. cystic

Breast Screening Ultrasound

- Some studies have should to be helpful in dense tissue
  - Lead to more biopsies

Breast MRI

- Magnetic Resonance Imaging (MRI)
  - diagnostic exam using large magnet, radio waves and computer to generate images of the organs and body structures

Breast MRI

- Patient is prone
- IV constrast — gadolinium
- Time — 45 minutes

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Breast MRI Indications

- Not a routine screening tool
- Too expensive
- Unable to see calcifications

Breast MRI Indications

- High Risk Screening
  - Lifetime risk of breast cancer of about 20-25% according to a risk assessment tool
  - Known BRCA1 or BRCA2 gene mutation carrier
  - 1st degree relative with a known BRCA gene mutation and they themselves have not been tested
  - History of chest radiation between the 10-30 years of age
  - Li-Fraumeni, Cowden syndrome or PTEN mutation

3D - Mammogram

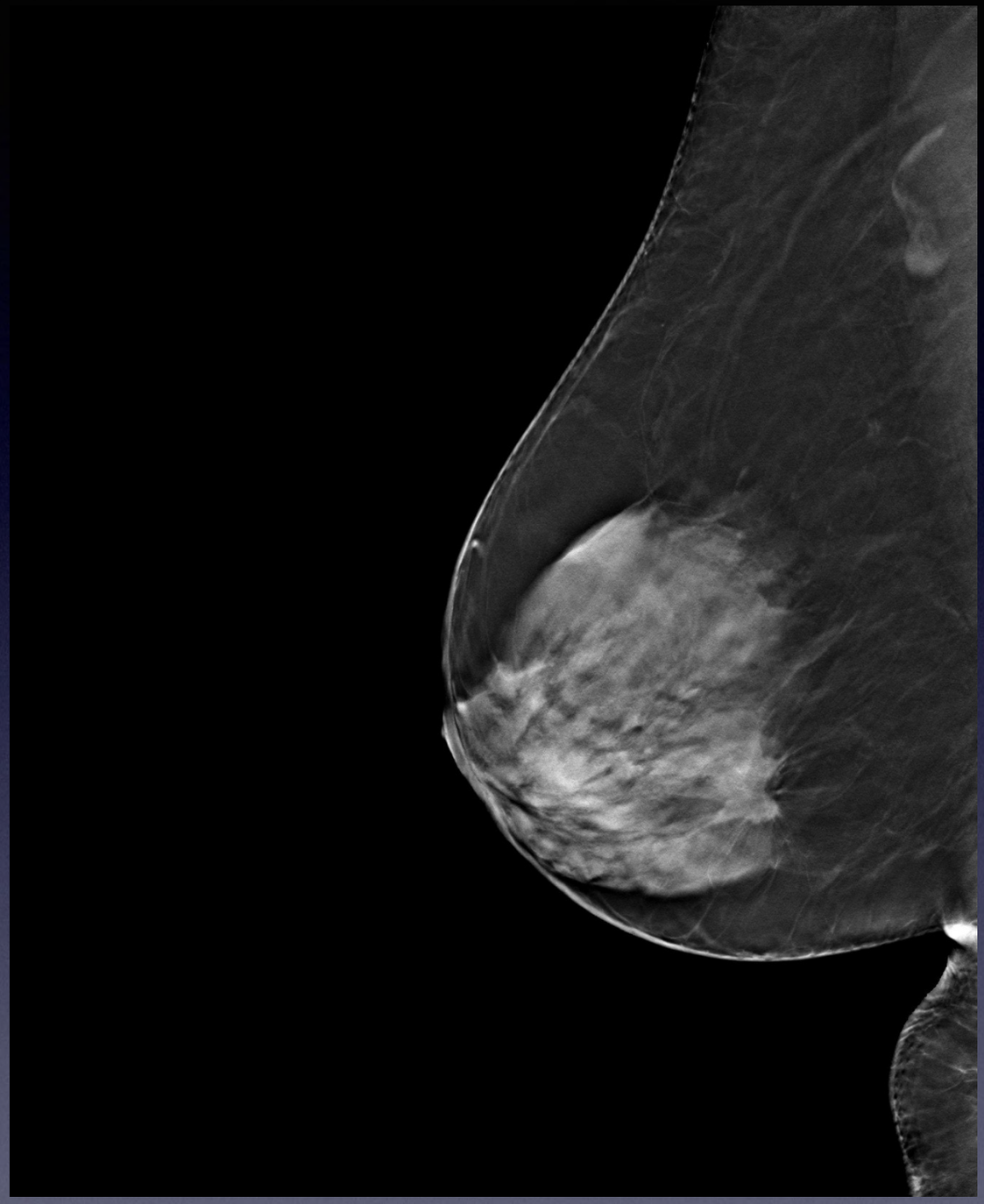
3D-Mammogram

- Tomosynthesis, Breast CT
- First developed in the 80s
- Feasible in the 90s
- FDA approved February 2011

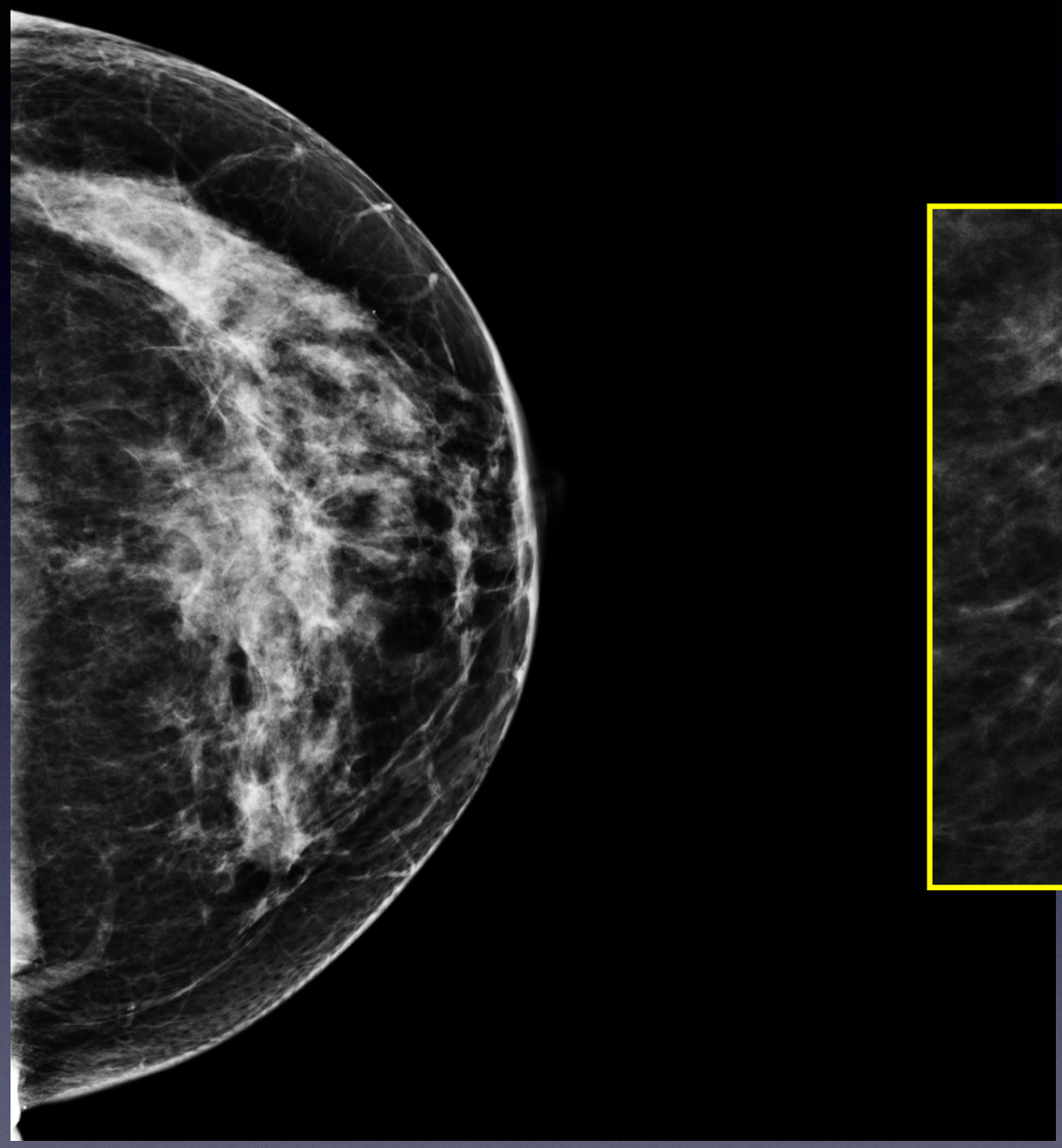
3D- Mammogram

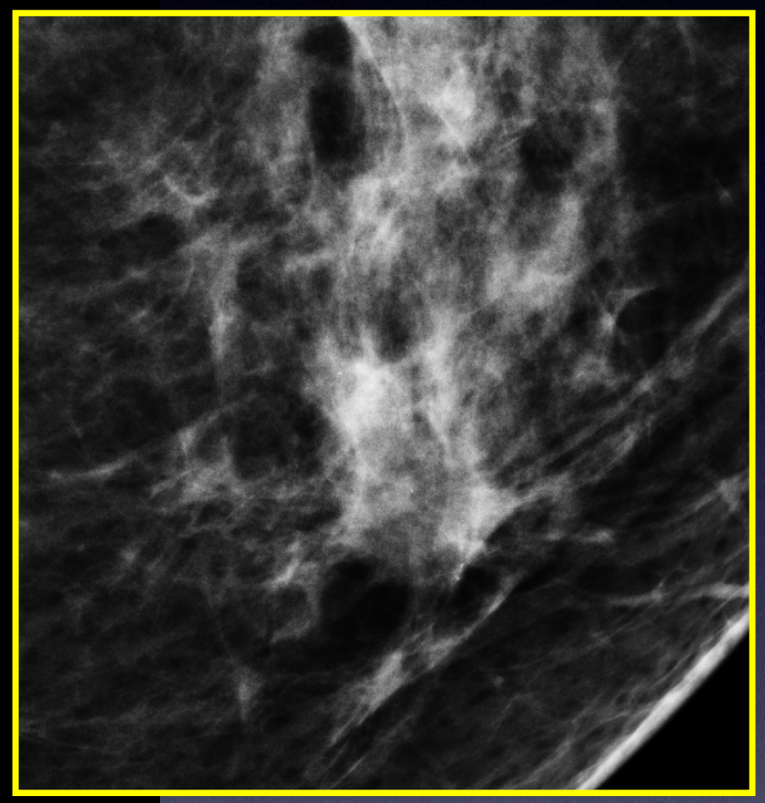
- Analogous to CT in it’s image acquisition
- Decreases superimposition, increases lesion conspicuity

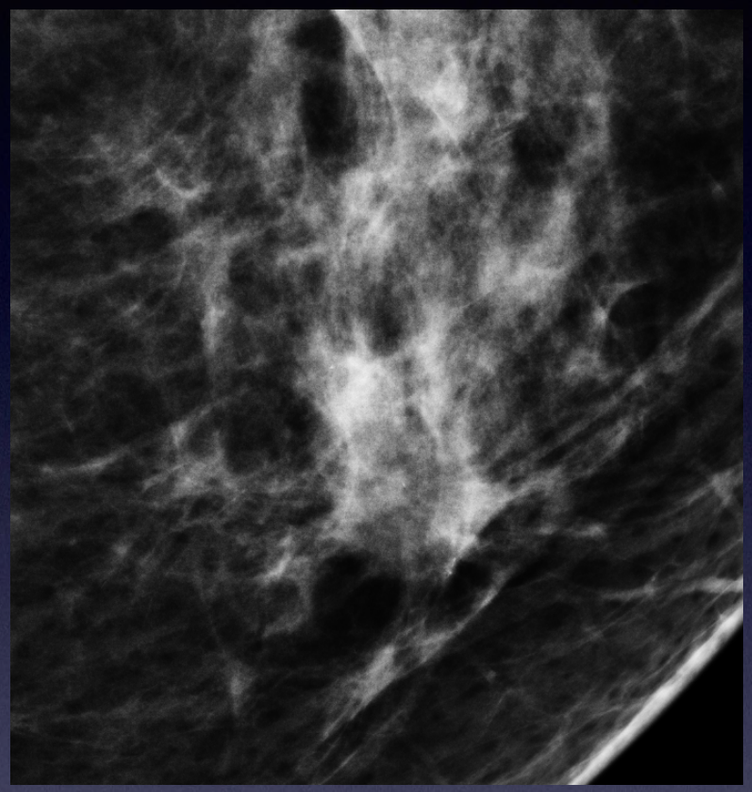
2D

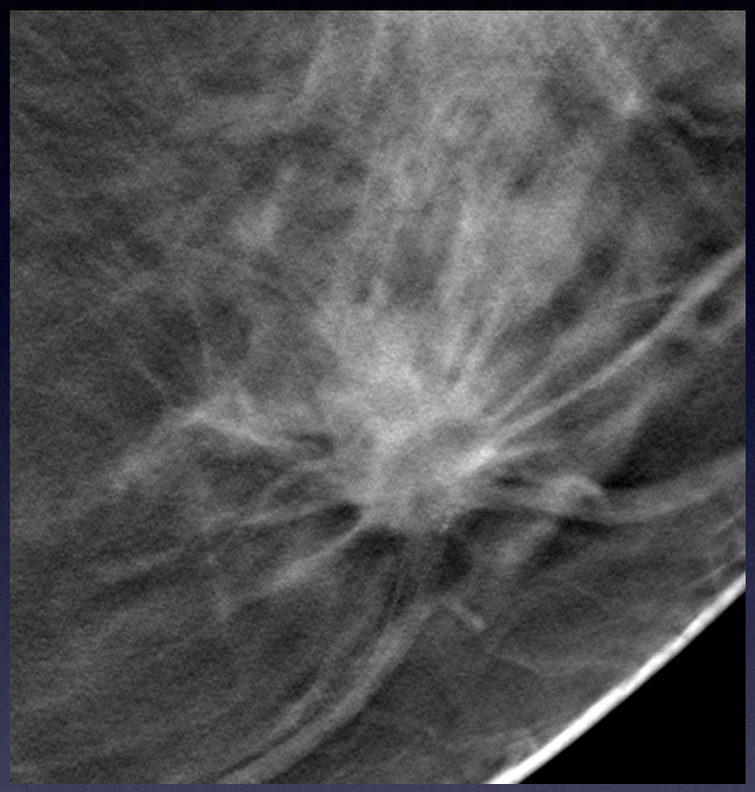


3D









3D- Technique

- 2-D images and tomo projectional images acquired using the same digital mammography station, same compression
- 4 second sweep
- 15 low dose projections continuously obtained

Cost

- Longer interpretation time, learning curve, decreases with interpreter experience
- Increased storage space, dependant on breast size, DBT increases storage requirements by a factor of 3, average of 400 MB
- No current CPT code for billing
- Currently an optional service: $50 charge covering the technical and professional fee

Questions — so far

Genetics Testing

Hereditary Breast Cancer

- 10% of all breast cancer and ovarian cancer diagnosis is considered to be hereditary

  - Hereditary Cancer: Inherited genetic change that causes cancer predisposition

  - Familial Cancer: More cancer in a family than we might expect, but no identifiable inherited genetic change. May be due to an unknown gene or genes, a shared environment, or both

Red Flags for Hereditary Breast Cancer

- Breast cancer diagnosed at age 50 or younger
- Ovarian cancer at any age
- Bilateral breast cancer or more than one breast cancer diagnosis
- Male breast cancer
- Triple negative breast cancer
  - ER negative, PR negative, Her2neu negative
- Ashkenazi Jewish ancestry
- Certain patterns of cancer types in a family
- More than one type of cancer in a single person
- Each generation of a family affected by cancer

BRCA1 and BRCA2: Hereditary Breast and Ovarian Cancer Syndrome

- BREast CAncer Genes 1 and 2
- Women with a BRCA mutation have a…
  - 60-87% lifetime risk for breast cancer
  - 20-54% lifetime risk for ovarian cancer
  - Up to a 60% risk for developing a second breast cancer in their lifetime
- Other cancers: male breast cancer, pancreatic, prostate, and melanoma

What other genes are related to breast and ovarian cancer?

Breast Cancer

- ATM
- BARD1
- BRIP1
- CDH1
- CHEK2
- NBN
- PALB2
- PTEN
- RAD51C
- STK11
- TP53

Ovarian Cancer

- BRIP1
- EPCAM
- MLH1
- MSH2
- MSH6
- PMS2
- RAD51C
- RAD51D
- STK11
- TP53

Genetic Counseling

- Help identify potential genetic health risks
- Help make informed, personalized decisions about genetic health
- Discuss prevention strategies, screening and treatment options
- Discuss genetic testing options and whether genetic testing is indicated
- Help understand genetic test results and explain what they mean for the patient and relatives
- Provide emotional and psychological support throughout the process

Questions???