# IMAGE EVALUATION FOR EQUIP:

## SETTING REALISTIC GOALS AND EXPECTATIONS

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## Expectations have changed

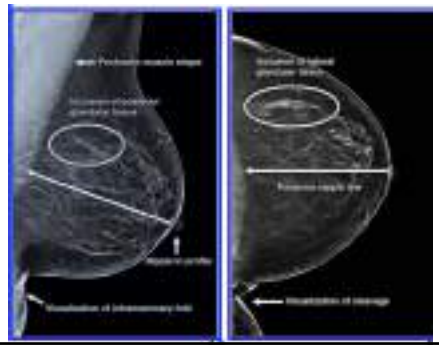
- ACR Accreditation
- MQSA - EQUIP
- ARRT
- Individual State requirements

## OBJECTIVES

- Describe methods for developing an effective EQUIP program
- Explain the importance of appropriate feedback
- Discuss way to sustain image improvement

## Technology Changes

- New technologies have physical differences compared to FS mammography, such as larger detector size and face shields that influence patient and breast positioning



- Digital detectors used in DBT acquisition demonstrate up to 49% increased length of the Bucky/IR
- DBT detectors have increased in thickness of up to 80%, when compared to FS cassettes

## Length of the IR

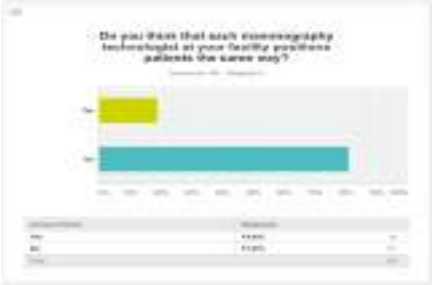
- On original 18x24 IR formats larger patients must be 'tiled'.
- On current, standard 24x30 IR formats it can be more difficult to image smaller patients on the larger IR even when changing compression paddles.

JM1

## Common positioning challenges
## FS - FFDM

- Increased visualization of skin/fat folds
- Poor visualization of IMF
- Poor visualization of length of the muscle

## Variations in positioning methods



## Positioning Challenges

- Adaptation to new imaging modalities
- Lack of standardized positioning techniques
- Emphasis on the "end result"
- Limited information for problem solving

## Slide 8

**LM1** Louise Miller, 2/28/2020

## See one, do one, teach one


With change comes challenge *and* opportunity…..but now we are expected to take "perfect" ACR quality images every time?

## WATCH ONE
## BOTCH ONE

## ACR Failures

70% fail due to positioning problems

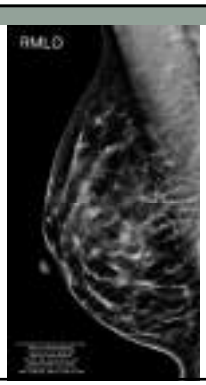

Source: https://www.fda.gov/Radiation-EmittingProducts/MammographyQualityStandardsActandProgram/FacilityScorecard/ucm495378.htm

If an average facility does 10,000 mammograms per year, that is 30,000 every 3 years. They need to send in 8 images that represent their best work. Those images represent .00026% (or 1 out of every 3,750) of their total images…..so you think it would be easy!

So how are we expected to do “perfect” images every time?

## Reasonable Expectations

- Data shows that even with the best positioning training only 64% will meet ACR criteria.
- Technologists must document patient limitations which must be reviewed by radiologist





DO THE BEST YOU CAN AND USE DATA!!

Mammography Positioning Standards in the Digital Era: Is the Status Quo Acceptable?

Methods for Solving the Most Common Positioning Problems

## Reasonable Expectations – AJR: Dec 2017

| | Positioning Criteria | FFDM | DBT | Bassett |
|---|---|---|---|---|
| MLO View | Visualization of Pec Muscle to PNL | 86% | 87% | 81% |
| | Concave Pec | 36% | 28% | - |
| | Straight Pec | 41% | 46% | - |
| | Convex Pec | 23% | 26% | - |
| | Wide Margin at Top of Pec | 95% | 93% | - |
| | No Motion | 98% | 97% | 99% |
| | Posterior Glandular Tissue Included | 90% | 94% | 77% |
| | Nipple in Profile | 89% | 92% | 88% |
| | Skin or fat folds | 53% | 62% | 15% |
| | Upper Location | 25% | 27% | - |
| | Lower Location | 35% | 45% | - |
| | Visualization of Inframammary Fold | 81% | 85% | 49% |
| | Requires More Than One View | 13% | 17% | - |
| CC View | Pec Muscle Visualized | 48% | 50% | 32% |
| | No Motion | 100% | 98% | - |
| | Lateral Glandular Tissue Included | 73% | 81% | 37% |
| | Nipple in Profile | 83% | 85% | 89% |
| | Skin or fat folds | 39% | 47% | 10% |
| | Medial Location | 16% | 23% | - |
| | Lateral Location | 29% | 32% | - |
| | Visualization of Cleavage | 41% | 34% | - |
| | Requires More Than One | | | |

## Most common problems

- "Short CC" PNL on CC not within 1cm of PNL measurement on MLO
- Nipple not centered or in profile
- Missing lateral glandular breast tissue
- IMF not visualized or "open"
- Inadequate visualization of pectoralis muscle
- Skin/fat folds

## Reasonable Expectations

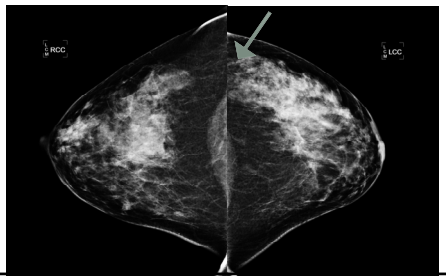
- Our patients have different and often challenging body habitus.
- Their breast size, shape, mobility and tenderness are hugely variable.

## "Short" CC

- Pull breast on with both hands.
- Anchor the breast at 12:00 with the base of your thumb.
- Lift contralateral breast up and over the corner of the image receptor.
- Push the patient forward using your hand, elbow and forearm.

*Elevate* the breast so the PNL is perpendicular to the chest wall and *pull* the breast on with both hands

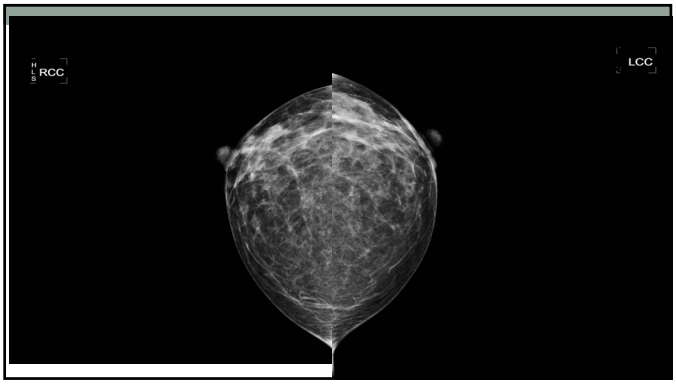
## Missing lateral, posterior glandular breast tissue?




## Nipple not in profile or centered

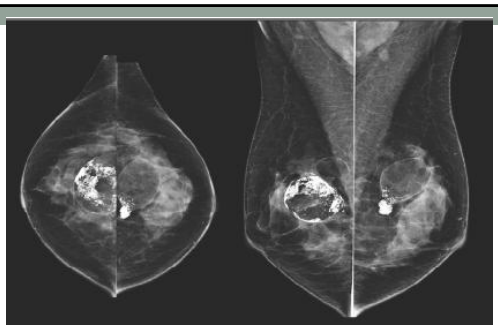
- The nipple must be in profile in at least one of the 2 standard views.
- If there is a question of a subareolar mass, two views should be obtained with nipple in profile.
- Breast tissue should not be scarified to visualize nipple in profile or to center the nipple. Additional views can be obtained as needed.

## Pull mobile, lateral breast tissue forward as compression is applied.




## Proper Use of the XCCL - Screening

- If posterior breast tissue is missing on the XCCL on a ***baseline*** study an XCCL should be perform on that side.
- On subsequent studies if glandular breast tissue is visualized back to the retromammary fat space on the MLO a XCCL is not needed
- If using this standard XCCLs should be performed on < 4% of all screening examinations (excluding baselines)



## Use an anatomical landmark to guide the patient into the correct position to visualize the IMF:

- The bottom corner of the IR should be placed on the inferior, vertical plane of the nipple (VNL)
- This is best accomplished by having the patient take a “side” step towards the technologist

## IMF not visualized or “open”

- Check the position of the patient.
- Check the location of the bottom of the IR.
- Maintain the breast in the up and out position.

## Improper

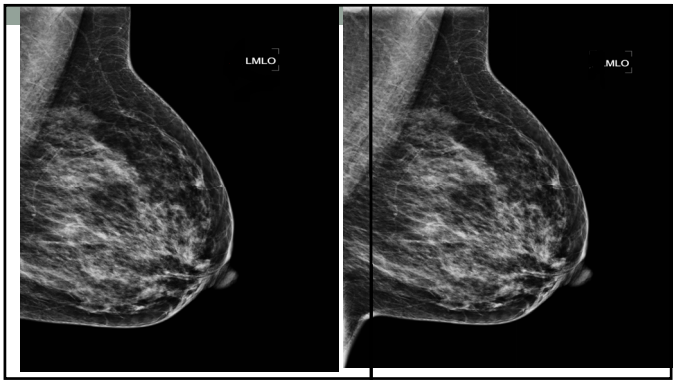
Edge of IR in front of IMF

## Proper

Edge of IR behind IMF

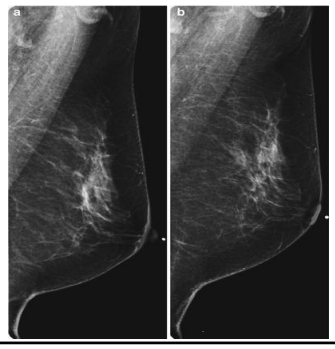
## Position of the Patient

- Patient must face the machine with both feet, hips and shoulders forward.
- Patient must move so that the bottom edge of the IR is just below the inferior plane of the nipple.



## IMF not visualized or "open"

- Check the position of the patient.
- Check the location of the bottom of the IR.
- **Maintain the breast in the up and out position.**



## Maintain the breast in the up and out position

- Keep the nipple as close as possible to perpendicular to the chest wall.
- Don't let go of the breast until compression **is complete.**
- This will help eliminate the "sagging breast"

## Inadequate visualization of pectoralis muscle

- Length
- Width
- Shape and opacity

## Solution for "sagging" breast

## Solutions:
### Inadequate visualization of pectoralis muscle

- **Length**
- Width
- Shape and opacity

## Length of the pectoralis muscle

- **Machine:** Length is related to the degree of angulation of the tube
- **Patient:** Both feet, hips and shoulders forward

## Position of the Patient

- Patient must be facing forward with both feet, shoulders and hips.
- Move the patient as described to include IMF.

## Angle of the tube

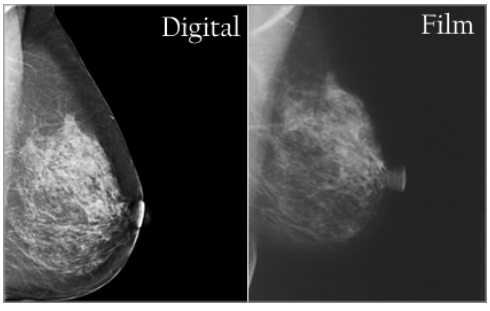
- Should be adjusted to patients free margin of the pectoralis muscle.
- Should be consistent from year-to-year and only changed to improve visualization of breast tissue.

## Inadequate visualization of pectoralis muscle

- Length
- **Width**
- Shape and opacity

## Keep angles consistent

- 40 for shorter, heavier patients with large breasts
- 45 for average patients
- 50 for tall, thinner patients with smaller breasts



## Width of the pectoralis muscle

- **Machine:** Front corner of the IR should be placed just anterior to the latissimus dorsi
- **Patient:** Must not pull her arm back

## Skin and fat folds

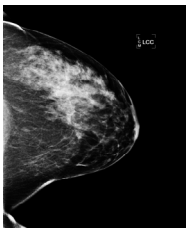
- Identify location (usually in IMF and axilla)
- Use updated, standardized positioning techniques to decrease folds
- Smooth out skin in these areas if needed

## Shape and opacity of the muscle

- **Machine:** Must be at the correct height to keep the shoulder relaxed and down
- **Patient:** Must relax her muscle as much as possible

## SKIN FOLDS - FAT FOLDS VS. ATTENUATION OF THE BEAM

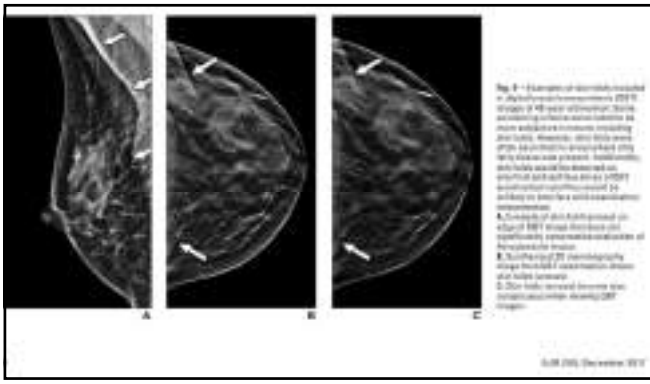
SKIN FOLD IN AXILLA



LATERAL AND MEDIAL ATTENUATION

## Convex


## Straight



These DBT images were TCBs. 2 eminent radiologist said they would NOT have asked for repeats


## We need

- The ability to provide specific corrective action plans for improving positioning errors
- Awareness of current data
- The establishment of updated standardized positioning techniques
- More educational opportunities for technologists
- Opportunities to educate radiologists as to what is a *reasonable* "repeatable offense".


**1. Horizontal fold is medial**
**2. Vertical fold is lateral**

## *Positioning Quality Improves with Technologist Education*

"Extra hands-on training in positioning appears to offer one of the best approaches to improve mammography positioning quality in the program, as many technologists have not had such additional training."*

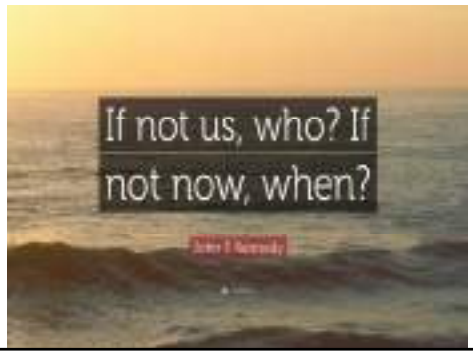
* Guertin, et al. Academic Radiology, 2016 Nov 24; 23(11):1359-1366

## Other considerations:

- Compare to previous studies as the compromised visualization of positioning criteria may be due to a chronic patient condition.
- Any physical or patient factors that compromise visualization of positioning criteria should be noted on history sheet and acknowledged by radiologist

It is ALL our responsibility to make sure that ALL women receive the highest quality of mammogram achievable.

CHANGE AND CHALLENGE




Thank you!

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