MAMMOGRAPHY ACCREDITATION PROGRAM IMAGE EVALUATION

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• I have no involvement or affiliation with a pharmaceutical, medical device or communications organization and do not have any conflict of interest
Learning Objectives

• At the end of this session, the participant will be able to:
  – Identify the criteria for optimal image evaluation for CAR-MAP
  – Recognize/demonstrate the requirements for passing the CAR-MAP image evaluation
  – Consider the challenges in choosing images for evaluation
Background

Began in 1991
- Modeled on ACR-MAP
- Voluntary program
- More than 80% of Canadian units accredited
Mammography Accreditation Program
Canadian Association of Radiologists

• Program Goals:
  – Establish standards for quality mammography
  – Ensure quality assurance practice
  – Assure high quality images at an appropriate radiation dose
Mammography Accreditation Program
Canadian Association of Radiologists

• Program Evaluates:
  – Personnel Training
  – Equipment
  – Quality Control Program
  – Radiation Dose
  – Processor Quality (film screen units)
Mammography Accreditation Program
Canadian Association of Radiologists

• Why Become Accredited?
  – Proven Performance
  – Facility meets external nationally recognized standards
  – Recognized by referring physicians and consumers
  – Mandatory Accreditation
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Canadian Association of Radiologists

• 2 part application
• 1st
  – Facility, personnel evaluated
Mammography Accreditation Program
Canadian Association of Radiologists

• Then, Facility Must Submit
  – Phantom Image
    • no longer using dosimeter
  – 4 clinical images (dense breast)
  – 4 clinical images (fatty breast)
Mammography Accreditation Program
Canadian Association of Radiologists

• Clinical Images
• 4 images from a patient with:
  • Fatty breast
    • <50% dense glandular tissue (BI-RADS breast composition categories A or B)
  • Dense breast
    • >50% dense glandular tissue (BI-RADS breast composition categories C or D)
Birads category A
Almost entirely fatty

Birads category B
Scattered area of fibroglandular tissue
Birads category C
Heterogeneously dense

Birads category D
Extremely dense
Image Evaluation Form

• A separate form is completed for each image set (dense and fatty breast)
• 2 categories of assessment
• Categories are scored from 1 (poor) to 4 (excellent)
• Images are assessed for compliance against the image quality standards, by criteria in each category
• The overall score from each reviewer is calculated and their composite scores provide the final result
Assumptions

• Images reflect the centre’s best work
• Images are selected by an individual knowledgeable in mammographic image quality
• Image defects appearing on most images reflect general level of performance
• Image defects appearing on a single image are either not recognized or are accepted
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• Over all pass rate is 85%
• Majority of failures related to positioning
Quality Improvement

It’s a Journey

Not a Destination
Clinical Image Evaluation

• Positioning
• Technical considerations
Clinical Image Evaluation

• Positioning
  – In 2016, 87% of all failures were due to positioning
Positioning MLO image

- Pectoralis muscle is visible at least to the level of the nipple
- Pectoral muscle is not concave or thin
  - minimum of 3 cm width of pec muscle visible at the upper image border
- Breast does not appear to sag
- Inframammary fold is present and open, clearly shown without any overlying or underlying tissue
- Breast is centered on the receptor
Positioning

- Posterior portions should be included on the MLOs and CCs to the greatest extent possible
- Portions of the breast should not project beyond the margins of the image
- Skin folds should not be present
- Other body parts are not projected over the breast
- Appropriate receptor size is chosen for the imaged breast
- Nipple is in profile in 1 of 2 views
Positioning CC view

- Breast centrally placed, nipple in midline without excessive exaggeration
- Nipple is in profile in 1 of 2 views
- The PNL on the CC view is depicted within one centimeter of the PNL on the MLO view
### A. POSITIONING

<table>
<thead>
<tr>
<th>Condition</th>
<th>RCC</th>
<th>LCC</th>
<th>RMLO</th>
<th>LMLO</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sagging breast</td>
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<tr>
<td>Inadequate amount of pectoralis muscle shown on image</td>
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<td>X</td>
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<td></td>
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<tr>
<td>(not within 1 cm of nipple level)</td>
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<tr>
<td>Inadequate inframmary fold (IMF)</td>
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<tr>
<td>Pectoralis muscle concave/thin</td>
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<tr>
<td>Breast positioned too high on image receptor</td>
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<td></td>
</tr>
<tr>
<td>Posterior nipple line (PNL) on CC not within 1 cm of MLO</td>
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<td></td>
<td>X</td>
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<tr>
<td>Excessive exaggeration</td>
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<tr>
<td>Poor visualization of posterior tissues</td>
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<tr>
<td>Portion of breast cut off</td>
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<tr>
<td>Skin folds</td>
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<tr>
<td>Other body parts projected over breast</td>
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<tr>
<td>Nipple not in profile in 1 of 2 views (must be in 1 view to)</td>
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</tbody>
</table>

### SCORE

**POOR 1**

Inadequate positioning

- Significant part of the breast not imaged
  - Inadequate amount of pectoralis muscle shown on image
  - Posterior nipple line (PNL) on CC not within 1 cm of MLO PNL
  - Nipple not in profile in one view

**INFERIOR 2**

Adequate positioning

- Most breast tissue imaged
  - Inadequate inframmary fold (IMF)
  - Pectoralis muscle concave/thin

**GOOD 3**

Good positioning (Acceptable for diagnostic purposes)

- All breast tissue imaged
  - All posteromedial tissue visualised
  - Skin folds which do not obscure the breast tissue

**EXCELLENT 4**

Excellent positioning

- No deficiencies

### Possible Cause(s):

- Technologist technique
- Wrong size image receptor
- Uncertain
- Other: ________________________________

### Comments/recommendations on positioning:

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________
Positioning

• Automatic failure if
  • Pectoralis muscle *not* visible at least to the level of the nipple

• Nipple *not* in profile in 1 of 2 views

• The PNL on the CC view *not* depicted within one centimeter of the PNL on the MLO view
Clinical Image Evaluation

- Positioning
- Technical considerations
### B. TECHNICAL CONSIDERATIONS

<table>
<thead>
<tr>
<th>Poor separation of parenchymal densities</th>
<th>RCC</th>
<th>LCC</th>
<th>RMLO</th>
<th>LMLO</th>
</tr>
</thead>
<tbody>
<tr>
<td>Non-uniform compression levels</td>
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<tr>
<td>Patient motion</td>
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<td>Poor delineation of linear structures</td>
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<td>Poor delineation of feature margins</td>
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<td>Poor delineation of microcalcifications</td>
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<tr>
<td>Generalized underexposure</td>
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<tr>
<td>Generalized overexposure</td>
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<tr>
<td>Inadequate penetration of dense areas</td>
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<tr>
<td>Excessive penetration of lucent areas</td>
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<tr>
<td>Inadequate contrast</td>
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<tr>
<td>Excessive contrast</td>
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<td>Visually striking mottle pattern</td>
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<td>Noise limited visualization of detail</td>
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<tr>
<td>Grid related artifacts</td>
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<tr>
<td>Hair, deodorant, etc.</td>
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<tr>
<td>Image receptor artifact</td>
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<tr>
<td>Other:</td>
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</table>

#### SCORE

**POOR 1**  
Inadequate  
- Inadequate compression  
- Blurred image

**INFERIOR 2**  
Adequate  
- Minor degrees of variation in criteria  
- Adequate compression

**GOOD 3**  
Good (Acceptable for diagnostic purposes)  
- Minor degrees of variation in criteria  
- Good compression  
- Absence of motion

**EXCELLENT 4**  
Excellent  
No deficiencies

#### Possible Cause(s):
- Poor positioning  
- Under compression  
- Underexposure  
- Lack of patient preparation  
- Detector calibration  
- Foreign objects calibrated into calibration file  
- Uncertain  
- Other: _______________________________________

#### Comments/recommendations:

__________________________________________________________________________

__________________________________________________________________________

__________________________________________________________________________

__________________________________________________________________________
Technical Considerations

- Appropriate compression
- Adequate exposure
- Adequate contrast
- No artifacts
Mammography Accreditation Program
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• Choosing the right of wrong set of images
• Some cases will not demonstrate your best work
  – Large, saggy breast
  – Very thin breast
  – Previous reduction mammoplasty
Reduction mammoplasty
Breast Cancer Screening

Adverse Effects

QA

Benefit
Learning Objectives

- At the end of this session, the participant will be able to:
  - Identify the criteria for optimal image evaluation for CAR-MAP
  - Recognize/demonstrate the requirements for passing the CAR-MAP image evaluation
  - Consider the challenges in choosing images for evaluation
Quality only happens when you try your best
Thank you!