2018 ACR DM QC Manual

AAPM Spring Clinical Meeting  |  Virtual  |  April 2020

Dustin A. Gress, MS, DABR, DABSNM
Senior Advisor for Medical Physics
American College of Radiology
Disclosures

- None
  - except
Outline

- Why do we care?
- Important resources
- Big picture
- Tips for switch
Why do we care?
Women aged 40–84 by year 1969–2015

42% mortality

Age-adjusted U.S. breast cancer mortality rates (per 100,000)

Mammography

~ 384,000-614,500 Lives saved

42% mortality

Perspective


- 58 years of follow up
- All women had either 10 or 20 years of follow up

Using the same available treatments,

SCREENED women had

60% LOWER mortality at 10 yrs follow up and
47% LOWER mortality at 20 yrs follow up

than UNSCREENED women
This matters.
Resources
For public consumption
https://www.acr.org/Clinical-Resources/Medical-Physics-Resources
Medical Physics Resources

These ACR resources, relevant to medical physicists, are both public and member-only and include ACR quality control manuals, ACR Accreditation resources, guidance documents, patient communication tools, and other helpful information.

Quality Control Manuals

- CT
- Mammography
- MR
- Stereotactic Breast Biopsy
DM QC Manual Resources

- Up-to-date FAQs
- Phantom scoring key (good for teaching!)
- Excel forms for QC tests (tech and med phys!)
- Webinars by Eric (tech and med phys!)
- Approved phantom vendors
# ACR Digital Mammography Phantom Scoring Key*

<table>
<thead>
<tr>
<th>Test Object</th>
<th>Full Point</th>
<th>Half Point</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fibers (6)</td>
<td>• Full length visible (≥8 mm long)</td>
<td>• At least half of length visible (≥5 and &lt;8 mm long)</td>
</tr>
<tr>
<td></td>
<td>• Correct location</td>
<td>• Correct location</td>
</tr>
<tr>
<td></td>
<td>• Correct orientation</td>
<td>• Correct orientation</td>
</tr>
<tr>
<td></td>
<td>• 1 break allowed (must be ≤ width of fiber)</td>
<td>• 1 break allowed (must be ≤ width of fiber)</td>
</tr>
<tr>
<td>Speck Groups (6)</td>
<td>• 4 - 6 specks visible</td>
<td>• 2 - 3 specks visible</td>
</tr>
<tr>
<td></td>
<td>• Correct locations</td>
<td>• Correct locations</td>
</tr>
<tr>
<td>Masses (6)</td>
<td>• Density difference visible</td>
<td>• Density difference visible</td>
</tr>
<tr>
<td></td>
<td>• Border is continuous and generally circular (≥ ¼ border visible)</td>
<td>• Border is not continuous or generally circular (≥ ½ and &lt; ¼ border visible)</td>
</tr>
<tr>
<td></td>
<td>• Correct location</td>
<td>• Correct location</td>
</tr>
<tr>
<td>Artifacts</td>
<td>Only fail for artifacts if they are in a location that could impact clinical interpretation and they are clinically significant. Fail if:</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Artifacts are as prominent as (or more prominent than) the visible test objects in the phantom, or</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Artifacts obscure test objects in the phantom, or</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Artifacts could affect clinical interpretation</td>
<td></td>
</tr>
</tbody>
</table>

**Performance Criteria:** ≥22 fibers, ≥3 speck groups, ≥22 masses, no clinically-significant artifacts

* Consult the ACR 2018 Digital Mammography Quality Control Manual and the FAQs for complete information on scoring the phantom.
Phantom
Purchasing phantom

- Must be from approved manufacturer
- Google “acr digital mammography qc manual resources”
  - https://www.acraccreditation.org/resources/digital-mammography-qc-manual-resources
- Mfr list at bottom of page
Mammo CME Toolkit

- Material for referrings & radiologists
- Decision aids
- Handouts
- Education videos
- PowerPoint for radiologists to present for CME

How do I know if I have dense breasts?
Breast density is determined by the radiologist — the doctor who reads your mammogram. There are four categories of mammographic density. The radiologist assigns each mammogram to one of the categories. Your doctor should be able to tell you whether you have dense breasts based on where you fall on the density scale. (See scale below.)

Radiologists classify breast density using a 4-level density scale:
- Almost entirely fatty
- Scattered areas of fibroglandular density
- Heterogeneously dense
- Extremely dense

Breast density in the U.S. (See pie chart)
- 10% of women have almost entirely fatty breasts
- 10% have extremely dense breasts
- 80% are classified into one of two middle categories

If I have dense breasts, do I still need a mammogram?
Yes. A mammogram is the only medical imaging screening test proven to reduce breast cancer deaths. Many cancers are seen on mammograms even if you have dense breast tissue.

Are any tests better than a mammogram for dense breasts?
In breasts that are dense, cancer can be hard to see on a mammogram. Digital breast tomosynthesis (DBT), also called 3D mammography, provides images of the breast in “slices” from many different angles making some abnormalities easier to see. DBT increases the number of cancers seen without additional testing. Ultrasound (US) and magnetic resonance imaging (MRI) can help find cancers that can’t be seen on a mammogram. However, both MRI and US show more findings that are not cancer, which can result in added testing.

What should I do if I have dense breasts?
What if I don’t?
If you have dense breasts, please talk to your doctor. Together, you can decide which, if any, additional screening exams are right for you.

If your breasts are not dense, other factors may still place you at increased risk for breast cancer — including a family history of the disease, previous chest radiation treatment for cancer and previous breast biopsies that show you are high risk. Talk to your doctor and discuss your history.

Even if you are at low risk, and have entirely fatty breasts, you should still get an annual mammogram starting at age 40.
The Big Picture
ACR Accreditation Programs

- Designed by members
- ACR staff: in near-constant contact with chairs
Paradigm emphasis

- 1. Radiologist leadership and oversight
- 2. MD-RT-MP teamwork
- 3. Medical physicist ownership
Demonstrate value

- Re-establish relationships
- Be the go-to resource
- Direct lines of communication
Standardization

- It’s good.
Standardization

- Expect cleaner MQSA inspections
- Standardization reduces errors
- No more chasing down mfr manual versions
- Current and future revisions will always be available
- Current and future forms will always be free
Unit MP tests (annual)

- Phantom – IQ & artifacts
- DBT Z-resolution
- Spatial resolution
- DBT volume coverage
- AEC
- Collimation (DBT only)
- AGD (HVL & output)
Pro tips for the switch

- Read the manual
- Read the manual again
- Have a meeting with lead tech, mgr, & LIP to plan
  - BUDGET FOR PHANTOM
- Schedule time to train technologist(s)
- Be the expert – consider this an opportunity
Outline - Summary

- Why do we care?
- Important resources
- Big picture
- Tips for switch
Acknowledgements

- Thomas Ruckdeschel, MS
  - Chair, ACR Subcommittee on Breast Imaging X-ray Physics
- Eric Berns, PhD
  - Former Chair, ACR Subcommittee on Breast Imaging X-ray Physics
  - Former Chair, ACR Subcommittee on QA in Mammography
- Priscilla F. Butler, MS, FAAPM, FACR