ACR Accreditation Update: USnd

E. Russell Ritenour, Ph.D.
Professor and Chief Physicist
Medical University of South Carolina
Charleston, South Carolina
ritenour@musc.edu

Medical University of South Carolina

ACR Accreditation as of March 2018

<table>
<thead>
<tr>
<th>MODALITY</th>
<th>ACCREDITED FACILITIES</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mammography</td>
<td>9414</td>
</tr>
<tr>
<td>MRI</td>
<td>7303</td>
</tr>
<tr>
<td>CT</td>
<td>7299</td>
</tr>
<tr>
<td>Ultrasound</td>
<td>6312</td>
</tr>
<tr>
<td>Nuclear Medicine</td>
<td>3061</td>
</tr>
<tr>
<td>Breast/Mammography</td>
<td>2524</td>
</tr>
<tr>
<td>PET</td>
<td>1696</td>
</tr>
<tr>
<td>Hematologic Angiography</td>
<td>1040</td>
</tr>
<tr>
<td>Breast/SRT</td>
<td>1790</td>
</tr>
<tr>
<td>Radiation Oncology</td>
<td>887</td>
</tr>
<tr>
<td>Total</td>
<td>35,841</td>
</tr>
</tbody>
</table>
**ACR Ultrasound Accreditation Program Requirements**

- Includes sections on:
  - Acceptance testing
  - Annual survey
  - Quality control testing (routine)
  - Preventive maintenance
- Physicist involvement in the program is strongly recommended, but not required

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**Acceptance testing**

- This is designated as an *optional* component of the program, although the value of acceptance testing is recognized in the document.
- Testing should include all tests to be performed in subsequent annual surveys, but may be more comprehensive.

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**Annual survey**

- A.S. is a *required* component of the program.
- Specific tests are designated, some required and some *optional*.
All scanners and probes in routine clinical use must be tested.

- A signed report describing results must be provided to the practice.
- Phantoms must be used for uniformity, sensitivity, and geometric accuracy tests.
  - No specific phantoms are described.
  - Commercial and custom phantoms are acceptable.
- No specific test methods are required.
- Subjective & objective methods are acceptable.
  - No specific performance benchmarks or pass-fail criteria are provided.

**Routine QC Program**

- Typically performed by:
  - Equipment service engineer.
  - Appropriately trained sonographer.
  - Biomed.

**Physical and mechanical inspection**

- **Scanner**
  - Wheel locks.
  - Monitor bezel.
  - Keyboard.
  - Power cable.
  - Probe ports.
  - Ancillary equipment.

- **Probes**
  - Face.
  - Handle / housing.
  - Cable connection to handle, strain relief.
  - Cable.
  - Connector.
**Image uniformity & artifact survey**

- **Most effective test for identifying problems**
- Scan a uniform test object/phantom showing moving speckle
  - Inspect image while scanning
  - Process a clip to produce a median or mean image (AAPM)
- **Assess artifact severity and needed action** (clinical images)

**Geometric accuracy:**

- Measure known axial, lateral, and (reconstructed) elevational distances with scanner calipers or an automated program
System sensitivity

- Common approaches
  - Visual DOP estimation
  - Calculation of DOP from SNR vs depth curve
    - IEC 61391-2

Ultrasound scanner electronic image display performance

- Critical component of performance assessment: Ultrasound scanner monitor is effectively a primary diagnostic display device
- No requirements of specific tests

Primary interpretation display performance

- This most likely means PACS workstations
- Testing only required for diagnostic workstations used for US exam primary interpretation, and located at same facility as the US scanner
- No requirements of specific tests
- Inclusion of display testing results obtained by PACS team or biomed service group would be acceptable
Routine quality control

- Routine QC is an optional (but recommended) component of the program
- Likely performed by a sonographer or service engineer

A subset of 5 of the annual tests are designated for routine QC
- Geometric accuracy is only needed for 3D or 4D probes, and is only checked in the elevational direction
- Test methods may be different than for annual survey, especially if a sonographer is performing them

Preventive maintenance

- This is a required component of the program
- Must be performed by a qualified service engineer
- PMs must be documented
  - Corrective action addressing issues found during annual surveys must also be documented, and included with applications for ACR (re)accreditation
### QCTest

<table>
<thead>
<tr>
<th>Test</th>
<th>ACR</th>
<th>MUSC</th>
<th>Performed by</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Mech. &amp; Elec.</td>
<td>6 mo.</td>
<td>3 mo.</td>
<td>Tech</td>
</tr>
<tr>
<td>2. Uniformity</td>
<td>6 mo.</td>
<td>3 mo.</td>
<td>Tech</td>
</tr>
<tr>
<td>3. Depth of Penet.</td>
<td>6 mo.</td>
<td>3 mo.</td>
<td>Tech</td>
</tr>
<tr>
<td>4. Anechoic Void</td>
<td>NA</td>
<td>3 mo.</td>
<td>Tech</td>
</tr>
<tr>
<td>5. Grey Scale Target</td>
<td>NA</td>
<td>3 mo.</td>
<td>Tech</td>
</tr>
<tr>
<td>6. Distance Accuracy</td>
<td>NA</td>
<td>12 mo.</td>
<td>Physicist</td>
</tr>
<tr>
<td>7. Axial Resolution</td>
<td>NA</td>
<td>12 mo.</td>
<td>Physicist</td>
</tr>
<tr>
<td>8. Monitor Testing</td>
<td>NA</td>
<td>12 mo.</td>
<td>Physicist</td>
</tr>
</tbody>
</table>

### Common Pitfalls in Ultrasound Accreditation

- Failure to review required attributes/testing instructions
- Technical imaging errors
- Submitting cine loops in place of required static images
- Incomplete Annual Survey report
- Lack of credentialed personnel
- Failure to send complete set of clinical images
- Submitting tech worksheets in place of physician reports
- Failure to submit diagnostic criteria for vascular exams
- Failure to perform annual QC

### Acknowledgements

- Nick Hangiandreau, PhD
- Sameer Tipnis, PhD
According to the new ACR ultrasound QC requirements, which of the following tests is not required during the annual survey?

1. Sensitivity
2. Geometric accuracy
3. Spatial resolution
4. Physical and mechanical integrity
5. Image uniformity and artifact survey

Reference: ACR ultrasound and breast ultrasound accreditation program requirements:
The new ACR ultrasound QC requirements specify pass/fail criteria for which of the following evaluations?

1. Sensitivity
2. Geometric accuracy
3. Image uniformity and artifact survey
4. All of these
5. None of these

Reference: ACR ultrasound and breast ultrasound accreditation program requirements:

What is the minimum number of annual routine ultrasound QC testing sessions?

1. 4
2. 3
3. 2
4. 1, plus the annual survey
5. Routine QC is recommended but is not absolutely required
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3. 2
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