AAPM Annual Meeting

ACR Accreditation Updates in CT, Ultrasound, Mammography and MRI:

ACR Accreditation Update in CT

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Chair, ACR CT Accreditation Program Physics Subcommittee
Learning Objective

• To understand the requirements of the ACR CT accreditation program, including updates to the QC manual as well as updates through the FAQ process.
ACR CT Accreditation Program

• The CT Accreditation Program involves the acquisition of clinical and phantom images, dose measurements and the submission of scanning protocols.
ACR CT Accreditation Program: What’s New?

- The GOALS remain the same
- The CONTEXT has changed
- CTAP started as a VOLUNTARY program
- 1-1-12: Medicare Part B REQ’D accreditation by a CMMS approved body
  - ACR CTAP was one of the approved bodies
ACR CT Accreditation Program: What's New?

- In CA, State Law REQUIRED accreditation by one of the bodies recognized by CMS
- That clause went into effect July 1, 2013
- Again, not REQUIRED to be ACR accredited, but it was one of the approved accrediting bodies.
ACR CT Accreditation Program: What’s New?

• The GOALS remain the same
• SOME aspects have changed
• A few highlights:
  – Electronic Submission
  – Requirements
  – QC manual
• http://www.acr.org/Quality-Safety/Accreditation/CT
ACR CT Accreditation Program: What’s New?

- ELECTRONIC SUBMISSION OPTION
- Submission can now be completely electronic (no film, no CDs)
- This includes forms, clinical images, phantom images and dosimetry spreadsheets
- Note that CD Submission is still available
ACR CT Accreditation Program: What’s New?

- Physics (Phantom Portion) testing is unchanged

- For each protocol being submitted:
  - CT number accuracy
  - Low-contrast resolution
  - Image uniformity
  - CTDI
ACR CT Accreditation Program: What’s New?

- Some values HAVE CHANGED

Note: The pediatric head and abdomen dose reference values and pass/fail criteria have been adjusted and are effective July 1, 2013.

<table>
<thead>
<tr>
<th>Examination</th>
<th>Pass/Fail Criteria</th>
<th>Reference Levels</th>
</tr>
</thead>
<tbody>
<tr>
<td>Adult Head</td>
<td>80</td>
<td>75</td>
</tr>
<tr>
<td>Adult Abdomen</td>
<td>30</td>
<td>25</td>
</tr>
<tr>
<td>Pediatric Head (1 year old)</td>
<td>40</td>
<td>35</td>
</tr>
<tr>
<td>Pediatric Abdomen (40-50 lb.)</td>
<td>20</td>
<td>15</td>
</tr>
</tbody>
</table>
ACR CT Accreditation Program: What’s New?

• Some values HAVE CHANGED
• PEDS CNR values changed as well

<table>
<thead>
<tr>
<th>Scan protocol</th>
<th>Pass/Fail Criteria CTDIvol (mGy)</th>
<th>Reference Value CTDIvol (mGy)</th>
<th>CNR</th>
</tr>
</thead>
<tbody>
<tr>
<td>Adult Head</td>
<td>80</td>
<td>75</td>
<td>1.0</td>
</tr>
<tr>
<td>Pediatric Head</td>
<td>40</td>
<td>35</td>
<td>0.7</td>
</tr>
<tr>
<td>Adult Abdomen</td>
<td>30</td>
<td>25</td>
<td>1.0</td>
</tr>
<tr>
<td>Pediatric Abdomen</td>
<td>20</td>
<td>15</td>
<td>0.4</td>
</tr>
</tbody>
</table>
ACR CT Accreditation Program: What’s New? QC Program

• New Requirements
• Effective Dec 1, 2013 all ACR CT accredited sites must maintain a documented quality control (QC) program and must comply with the min. frequencies of testing outlined in the manual

- CT QC manual was released 12-1-12
- Updated August 2013
- Available on ACR CTAP swesbite
- http://www.acr.org/Quality-Safety/Accreditation/CT
ACR CT Accreditation Program: QC Manual

• Three main sections:
  – Radiologist Section
  – Technologist Section
  – Medical Physicist Section
ACR CT Accreditation Program: QC Manual – Radiologist Section

- Definition of Quality Assurance
- Definition of Equipment Quality Control
- Responsibilities of the Radiologist
- Responsibilities of the Quality Control Tech.
- Responsibilities of Qualified Med Physicist
## Table 1. QC Test Frequency

<table>
<thead>
<tr>
<th>TEST</th>
<th>FREQUENCY</th>
</tr>
</thead>
<tbody>
<tr>
<td>Medical Physicist’s Survey</td>
<td></td>
</tr>
<tr>
<td>Review of Clinical Protocols</td>
<td>Annually</td>
</tr>
<tr>
<td>Scout Prescription and Alignment Light Accuracy</td>
<td>Annually</td>
</tr>
<tr>
<td>Image Thickness</td>
<td>Annually</td>
</tr>
<tr>
<td>Table Travel Accuracy</td>
<td>Annually</td>
</tr>
<tr>
<td>Radiation Beam Width</td>
<td>Annually</td>
</tr>
<tr>
<td>Low-Contrast Performance</td>
<td>Annually</td>
</tr>
<tr>
<td>Spatial Resolution</td>
<td>Annually</td>
</tr>
<tr>
<td>CT Number Accuracy</td>
<td>Annually</td>
</tr>
<tr>
<td>Artifact Evaluation</td>
<td>Annually</td>
</tr>
<tr>
<td>CT Number Uniformity</td>
<td>Annually</td>
</tr>
<tr>
<td>Dosimetry</td>
<td>Annually</td>
</tr>
<tr>
<td>Gray Level Performance of CT Acquisition Display</td>
<td>Annually</td>
</tr>
<tr>
<td>Monitors</td>
<td></td>
</tr>
<tr>
<td><strong>Radiologic Technologist’s QC</strong></td>
<td></td>
</tr>
<tr>
<td>Water CT Number &amp; Standard Deviation</td>
<td>Daily</td>
</tr>
<tr>
<td>Artifact Evaluation</td>
<td>Daily</td>
</tr>
<tr>
<td>Wet Laser Printer Quality Control</td>
<td>Weekly</td>
</tr>
<tr>
<td>Visual Checklist</td>
<td>Monthly</td>
</tr>
<tr>
<td>Dry Laser Printer Quality Control</td>
<td>Monthly</td>
</tr>
<tr>
<td>Display Monitor Quality Control</td>
<td>Monthly</td>
</tr>
</tbody>
</table>
ACR CT Accreditation Program: QC Manual – Technologist Section

- Technologist Daily Quality Control
- Technologist Weekly Quality Control
- Technologist Monthly Quality Control
### Table 1. Technologist’s QC Tests: Minimum Frequencies

<table>
<thead>
<tr>
<th>PROCEDURE</th>
<th>MINIMUM FREQUENCY</th>
<th>APPROXIMATE TIME IN MINUTES</th>
</tr>
</thead>
<tbody>
<tr>
<td>Water CT Number and Standard Deviation</td>
<td>Daily</td>
<td>5</td>
</tr>
<tr>
<td>Artifact Evaluation</td>
<td>Daily</td>
<td>5 (or less)</td>
</tr>
<tr>
<td>Wet Laser Printer Quality Control</td>
<td>Weekly</td>
<td>10</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(if film is used for primary interpretation)</td>
</tr>
<tr>
<td>Visual Checklist</td>
<td>Monthly</td>
<td>5</td>
</tr>
<tr>
<td>Dry Laser Printer Quality Control</td>
<td>Monthly</td>
<td>10</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(if film is used for primary interpretation)</td>
</tr>
<tr>
<td>Display Monitor Quality Control</td>
<td>Monthly</td>
<td>5</td>
</tr>
</tbody>
</table>
ACR CT Accreditation Program: QC Manual – Physicist Section

• Annual Tests
  – Protocol Review
  – Scout Prescription and Alignment Light Accuracy
  – Image Thickness
  – Table Travel Accuracy
  – Radiation Beam Width
  – Low Contrast Performance
ACR CT Accreditation Program: QC Manual – Physicist Section

- Annual Tests
  - Protocol Review
  - Scout Prescription and Alignment Light Accuracy
  - Image Thickness
  - Table Travel Accuracy
  - Radiation Beam Width
  - Low Contrast Performance
ACR CT Accreditation Program: QC Manual – Physicist Section

• Annual Tests (continued)
  • Spatial Resolution
  • CT Number Accuracy
  • Artifact Evaluation
  • CT number uniformity
  • Dosimetry
  • Gray Level Performance of CT Acquisition Display Monitors
ACR CT Accreditation Program: Frequently Asked Questions (FAQs)

• CTAP has used FAQs since the beginning
• FAQs for accreditation submissions
• *NEW* FAQs for QC manual as well
  – Clarifications
  – Scanner specific responses (often in conjunction with manufacturers)
The ACR CT Accreditation Program’s CTDIvol Pass/Fail Limit for Pediatric Head is now:

1. 10 mGy
2. 20 mGy
3. 30 mGy
4. 40 mGy
5. As Low As Reasonably Achievable
The ACR CT Accreditation Program’s CTDIvol Pass/Fail Limit for Pediatric Body is now:

1. 10 mGy
2. 20 mGy
3. 30 mGy
4. 40 mGy
5. As Low As Reasonably Achievable
The ACR CT Accreditation Program’s CNR Value for Pediatric Head is now:

1. 0.1
2. 0.4
3. 0.7
4. 1.0
5. As High As Reasonably Achievable
The ACR CT Accreditation Program’s CNR Value for Pediatric Body is now:

1. 0.1
2. 0.4
3. 0.7
4. 1.0
5. As High As Reasonably Achievable
The ACR CT Accreditation Program’s QC Manual Requires

1. Monthly Review of All Protocols
2. Monthly Evaluation of CT Number of Water
3. Annual Review for Artifacts
4. Annual Evaluation of Radiation Beam Width
5. Daily Review of CT Doses