ACR Update in Nuclear Medicine Accreditation

Beth A. Harkness, MS, DABR, FACR
Henry Ford Health System
Detroit, MI

Disclaimer

- ACR physics subcommittee for nuclear medicine accreditation.
- My facility is ACR accredited for Nuclear Medicine and PET.
- I have attempted to provide accurate information. Information on the ACR website will be the most current and correct information.
- www.acraccreditation.org

Accreditation Statistics

<table>
<thead>
<tr>
<th></th>
<th>Active</th>
<th>Accredited</th>
</tr>
</thead>
<tbody>
<tr>
<td>Modality</td>
<td>Facilities</td>
<td>Users</td>
</tr>
<tr>
<td>NM</td>
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<td>5762</td>
</tr>
<tr>
<td>PET</td>
<td>1591</td>
<td>1702</td>
</tr>
</tbody>
</table>

*Active = Accredited + new + under review.

Changes to the Accreditation Process

In the fall of 2018, all sites (except mammography facilities with screen-film units) will be required to upload images for accreditation.

Visit acraccreditation.org to find the most current instructions for uploading images.

Changes to the NM Accreditation Process

- 7/1/2010 – Only the Data Spectrum Deluxe Phantom will be accepted.
- 9/19/2011 – $^{99m}$Tc and $^{67}$Ga/$^{111}$In SPECT requirement removed.
- 7/10/2014 – Continuing experience and CME requirements for physicians and physicists.
- 6/23/16 – Added ABR MOC to the existing CEU requirements.

Some Minor Tweaks

- Removed recon method from clinical data form.
- Added alternative reconstruction to phantom form.
- Annual tests
  - Count rate performance
  - Maximum is the only requirement
  - Formatter was removed
- Adding new exams
Nuclear Medicine Clinical Exams Required by ACR

<table>
<thead>
<tr>
<th>Module 1: Planar</th>
<th>Module 2: SPECT</th>
<th>Module 3: Cardiology</th>
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</thead>
<tbody>
<tr>
<td>Required Studies</td>
<td>BLM SPECT</td>
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<tr>
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<td>SPECT myocardial</td>
<td>SPECT myocardial</td>
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<tr>
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<td>Bone SPECT</td>
<td></td>
</tr>
<tr>
<td>Brain</td>
<td>Bone SPECT</td>
<td></td>
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<tr>
<td>Gastric emptying</td>
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<td>Liver</td>
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<tr>
<td>Thymus</td>
<td>Thymus</td>
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<tr>
<td>Whole body or spot bone</td>
<td>Whole body or spot bone</td>
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</tr>
</tbody>
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PET Clinical Exams

- 2 PET clinical exams for each module
- One normal and one abnormal

Modules
- Oncology
  - Cervical only
  - No fused images
- Brain
  - Ventricular, sagittal, and coronal
  - Immobility correction
- Cardiac
  - AHA/ACC standard orientation

QC and Phantom Data Scored by the ACR for Accreditation

<table>
<thead>
<tr>
<th>Module 1 Planar</th>
<th>Module 2 SPECT</th>
<th>Module 3 Myocardial Perfusion</th>
<th>Module 4 PET</th>
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<tr>
<td>Resolution</td>
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A CR Approved SPECT Phantom

- Cylindrical phantom
  - Internal radius 510 cm
  - Internal length 20 cm
- Lower half
  - 4 parallelepiped sections of Lucite rods
  - Rod diameters: 4.8, 6.4, 7.9, 9.5, 11.1, and 12.7 mm
- Upper half
  - 6 Lucite spheres
  - Sphere diameters: 9.5, 12.7, 15.9, 19.1, 25.4, and 31.8 mm

Data Spectrum Small SPECT Phantom

- Approved for:
  - DA-FECT
  - GE 530c
  - GE 570c
  - CardiArc
  - maxCam
  - C2
  - P4000
  - ClearVision
  - Neurologica
Common Pitfalls
- Incorrect/incomplete paperwork
- Failure to read and then follow instructions
- Images acquired for the wrong number of counts
  - Uniformity image < or > 10 M counts
  - SPECT phantom ≤ 32 M counts
- SPECT data not processed properly
- PET phantom not filled properly
- Attenuation correction not applied
- Procedures not in compliance with standards

Field Uniformity
- 10 Million Counts
- 256 matrix
- 0-100% window
- Clearly labeled
- Grayscale

Uniformity Calibration Flood
Problems
- Calibration data
- 100-200 M cts.
- Uniformity correction is not applied
- Windowed incorrectly

Windowed Incorrectly

No Curvature Correction
(Particular to Siemens Cameras)
Color Image

PMT Failure

Planar Resolution Data

Planar Resolution Data

SPECT Reconstructed Data

Without Attenuation Correction
Summed Resolution Image With and Without Attenuation Correction

Severe Non-uniformity Artifact

Phantom Assembled Incorrectly and Significant Ring Artifact

Images Correctly Sized

Images too Small

Images too Large