

# AAPM Annual Meeting

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

### *ACR Accreditation Update in CT*

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# Learning Objective

- To understand the requirements of the ACR CT accreditation program, including updates to the QC manual, FAQ process and the newest program – ACR Designated Lung Screening Center.

# 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.

**ACR CT Accreditation Dose Pass/Fail Criteria and Reference Levels**

Examination	Pass/Fail Criteria	Reference Levels
	CTDI <sub>vol</sub> (mGy)	CTDI <sub>vol</sub> (mGy)
Adult Head	80	75
Adult Abdomen	30	25
Pediatric Head (1 year old)	40	35
Pediatric Abdomen (40-50 lb.)	20	15

# ACR CT Accreditation Program: What's New?

- Some values **HAVE CHANGED**
- **PEDS CNR** values changed as well

<b>Scan protocol</b>	<b>Pass/Fail Criteria CTDIvol (mGy)</b>	<b>Reference Value CTDIvol (mGy)</b>	<b>CNR</b>
Adult Head	80	75	1.0
Pediatric Head	40	35	0.7
Adult Abdomen	30	25	1.0
Pediatric Abdomen	20	15	0.4

# 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

# ACR CT Accreditation Program: What's New? QC Manual

- CT QC manual was released 12-1-12
- Updated August 2013
- Available on ACR CTAP website
- <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

# ACR CT Accreditation Program: QC Manual – Radiologist Section

**Table 1. QC Test Frequency**

TEST	FREQUENCY
<b>Medical Physicist's Survey</b>	
Review of Clinical Protocols	Annually
Scout Prescription and Alignment Light Accuracy	Annually
Image Thickness	Annually
Table Travel Accuracy	Annually
Radiation Beam Width	Annually
Low-Contrast Performance	Annually
Spatial Resolution	Annually
CT Number Accuracy	Annually
Artifact Evaluation	Annually
CT Number Uniformity	Annually
Dosimetry	Annually
Gray Level Performance of CT Acquisition Display Monitors	Annually
<b>Radiologic Technologist's QC</b>	
Water CT Number & Standard Deviation	Daily
Artifact Evaluation	Daily
Wet Laser Printer Quality Control	Weekly
Visual Checklist	Monthly
Dry Laser Printer Quality Control	Monthly
Display Monitor Quality Control	Monthly

# ACR CT Accreditation Program: QC Manual – Technologist Section

- Technologist Daily Quality Control
- Technologist Weekly Quality Control
- Technologist Monthly Quality Control



# ACR CT Accreditation Program: QC Manual – Technologist Section

**Table 1. Technologist's QC Tests: Minimum Frequencies**

<b>PROCEDURE</b>	<b>MINIMUM FREQUENCY</b>	<b>APPROXIMATE TIME IN MINUTES</b>
Water CT Number and Standard Deviation	Daily	5
Artifact Evaluation	Daily	5 (or less)
Wet Laser Printer Quality Control	Weekly (if film is used for primary interpretation)	10
Visual Checklist	Monthly	5
Dry Laser Printer Quality Control	Monthly (if film is used for primary interpretation)	10
Display Monitor Quality Control	Monthly	5

# 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: QC Manual – Physicist Section

- Each Test:
  - Objective
  - Frequency
  - Equipment (ACR Phantom or Mfr Phantom)
  - Test Procedure
  - Data Interpretation and Analysis
  - Precautions and Caveats
  - Recommended Perform Criteria and Correct. Action
  - Timeframe for Corrective Action

# 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)
  - <http://www.acr.org/~media/ACR/Documents/Accreditation/CT/CT%20QC%20Manual%20FAQ%2081613%20Final.pdf>

# ACR Designated Lung Screening Center

- Announced Spring 2014 (> 1000 facilities already)
- Unit-specific
- All sites applying for this designation must:
- Have active ACR CT accreditation in chest module on designated unit(s).
- AND meet the requirements described in the application
- (yes, it costs \$400 per facility)
- <http://www.acr.org/Quality-Safety/Lung-Cancer-Screening-Center>



# ACR Designated Lung Screening Center



- Application:
  - Site Information/Demographics, supervising physician and CT unit info
  - Attestation form
    - NOTE: No Phantom, No Clinical Images, No CTDI measurement spreadsheets (you're welcome!)
  - The facility's lung cancer screening protocol in a clinical data form
  - Fee
- <http://www.acr.org/Quality-Safety/Lung-Cancer-Screening-Center>

# ACR Designated Lung Screening Center



- **Attestation form**
  - Recommended Screening Population
  - Personnel Qualifications
    - interpreting physicians
    - Medical physicists and radiologic technologists
  - Follow up System
    - structured reporting system
  - Smoking Cessation
  - CT Equipment
  - Quality Control
  - Imaging Protocol will be submitted (next slide)
  - Attestation that ACR-STR Practice Parameter has been reviewed and will be followed
- <http://www.acr.org/Quality-Safety/Lung-Cancer-Screening-Center>



# ACR Designated Lung Screening Center

- Imaging Protocol submission form



## LUNG CANCER SCREENING DATA FORM

**PRIVILEGED and CONFIDENTIAL • PEER REVIEW**

Release or disclosure of this document is prohibited in accordance with Code of Virginia 8.01-581.17

**CTAP # \_\_\_\_\_ Unit # \_\_\_\_\_ Site's CT scanner Serial number: \_\_\_\_\_**

**CT scanner manufacturer: \_\_\_\_\_ Model name: \_\_\_\_\_**

**Nmax: Maximum number of axial images able to be acquired simultaneously in one rotation (Nmax): \_\_\_\_\_**

**Minimum tube rotation time: \_\_\_\_\_**

<b>Acquisition Series only (not reformatted series) NOTE: Standard sized patient (5'7", 154 pounds)</b>	<b>Scan Sequence 1</b>
Anatomic scan coverage (start/stop locations)	
Single Breath hold/Full Inspiration (Y/N)	
Scan duration/Acquisition time (through entire lungs)	
kV for standard sized patient	
mA for standard sized patient (do not use mAs, effective mAs or mAs per slice)	
Time per rotation (s)	

Effective mAs (or mAs per slice) as displayed by scanner, for standard sized patient	
Automatic Tube Current Modulation Used (Y/N)	
If yes, list the name of the method (e.g. CareDose4D, Smart mA, Z-Dom, SureExposure, etc.) and Image Quality Reference Parameter (e.g. Noise Index, Quality reference mAs, etc.)	
Automatic kV selection Used (Y/N)	
If Yes, default kV for standard sized patient	
Scan FOV (cm) <i>Must be reported in cm.</i>	
Display FOV 1 cm beyond the rib cage (Y/N)	
Reconstruction algorithm/method: conventional (e.g. filtered backprojection) or advanced (e.g. iterative or other advanced)	
Reconstruction parameters: For conventional list the recon filter or kernel name; For advanced, list the recon parameters (e.g. %ASIR, Strength, etc.)	

Detector configuration: Number of data channels actively used (N)	
Detector configuration: Nominal width of each data channel (T, in mm)	
Table feed per 360 degree rotation of the x-ray tube (e.g. table speed, table feed, etc. in mm/rot) - I	
Pitch (IEC definition) $Pitch = I/N * T$	
Nominal width of reconstructed image along the z axis (e.g. thickness, slice width, in mm, reconstructed scan width (mm)	
Distance between two consecutive reconstructed images (e.g. interval, increment, spacing, in mm, reconstructed scan interval (mm)	
MIPS/MPRs (Y/N)	
CTDIvol (recorded after scanning) for a standard sized patient, using 32 cm CTDI phantom	
DLP (Dose length product) for standard sized patient	
Size specific protocols used (Y/N)	
If Yes, describe method (e.g. manual adjustment, automatic adjustment such as CareDose4D, DoseRight ACS, Smart mA, IntelliEC, etc.)	

# Conclusion

Described:

- Req's of the ACR CT accreditation program
- Updates to the QC manual
- FAQ process
- Designated Lung Screening Center