

# CT Accreditation Program Requirements



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## Overview

The CT Accreditation Program involves the acquisition of clinical and phantom images, dose measurements, and the submission of scanning protocols. Every unit used to produce diagnostic clinical images for patients must successfully pass accreditation testing for the facility to be accredited. Facilities that use units that have been withdrawn, expired, or failed accreditation testing or facilities that never submit a unit for accreditation testing are subject to revocation of their accreditation. Such revocation could adversely affect reimbursement. Every unit must apply for all modules routinely performed on that unit for a facility to be accredited. For sites that perform only adult CT scanning, clinical images required for submission will be both basic and specialized examinations in the modules routinely performed on that unit. For sites that do occasional pediatric scanning ( $\leq 15$  years of age) in addition to adult work, an additional exam performed on a child will also have to be selected for submission. Sites that perform only pediatric examinations (**only** patients  $\leq 15$  years of age) will have to submit basic and specialized exams tailored to the pediatric population (see selection list under Clinical Images section for all three patient type scenarios).

## Mandatory Accreditation Time Requirements

Submission of all accreditation materials is subject to mandatory timelines. Detailed information about specific time requirements is located in the *Overview for the Diagnostic Modality Accreditation Program*. Please read and be familiar with these requirements.

## Withdrawn, Added, or Replacement Units

The CT Accreditation Program is unit based. Consequently, facilities **must notify the ACR** if they have permanently **withdrawn** (i.e., removed) a unit from service, if they have **replaced** that unit with a new one or have **added** another unit. The type of accreditation options available for a new unit will depend on the amount of **time the facility has left on its current accreditation certificate**:

- **Over 13 months** – The facility needs to submit only unit information and additional testing materials. Once accreditation is approved, the new unit's expiration date will be the same as the previous expiration date.
- **Less than 13 months** - The facility must renew accreditation for all units at the facility including the new one. Once approved, all of the units at the facility will have an expiration date that is three years from the old expiration date.

CT units that receive replacements or upgrades to any of the major subassemblies after accreditation is granted will be treated as new units and follow the procedures above. Facilities are only required to report modifications that change the unit's model number. If the unit changes from an adult- or pediatric-only unit to an adult + pediatric unit, an additional adult or pediatric examination must be submitted. If less than thirteen months are left on the facility's accreditation, it must renew the accreditation of all of its equipment at the same time.

## Loaner unit

Accredited facilities may use a "loaner" unit to temporarily replace an accredited unit that is out of service for repairs, etc. for up to six months without submitting clinical and phantom images for evaluation. The accredited facility must immediately notify the ACR of the installation date, manufacturer and model of the loaner. Any loaner unit that is in use for more than one month will be required to submit evidence of testing by a qualified medical physicist within 90 days of installation. If the loaner is in place for longer than six months, the facility

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must submit the unit for accreditation evaluation, including clinical and phantom image assessment and the corresponding fee.

## **Personnel Qualifications**

*All* interpreting physicians, medical physicists and technologists working in CT (including part-time and locum tenens staff) ***must meet and document*** specific requirements in order for their facility to be accredited by the ACR.

The continuing education and continuing experience requirements are based on previous full calendar years. For example, if a site renews their accreditation in July 2009, the physicians and medical physicists/MR scientists at that site must have met the full requirement for continuing education from January 1, 2006 to December 31, 2008. Likewise, they must have met the full continuing experience requirements from January 1, 2007 to December 31, 2008. If they did not meet these requirements in the given timeframes, the ACR will accept continuing education credits or continuing experience obtained in 2009.

## Physician

All physicians who supervise and/or interpret CT examinations must be a licensed medical practitioner who meets the following minimum criteria

Requirements for all Physicians Supervising and/or Interpreting CT Examinations		
Qualifications	Radiologists	Other Physician
<b>Initial</b>	<ul style="list-style-type: none"> <li>Board certification in radiology or diagnostic radiology by:               <ul style="list-style-type: none"> <li>ABR,</li> <li>American Osteopathic Board of Radiology,</li> <li>Royal College of Physicians and Surgeons of Canada, or</li> <li>Le College des Medecins du Quebec, and</li> </ul> </li> <li>If board certified <b>before 2008</b> must also meet the following:               <ul style="list-style-type: none"> <li>Oversight, interpretation and reporting of 300 CT examinations in the past 36 months<sup>1, 2</sup></li> </ul> </li> </ul> <p style="text-align: center;"><b>OR (Not Board Certified)</b></p> <ul style="list-style-type: none"> <li>Completion of an Accreditation Council for Graduate Medical Education (ACGME) or American Osteopathic Association (AOA) diagnostic radiology residency, and</li> <li>Performance of, as well as interpretation and reporting of, 500 CT examinations in the past 36 months.<sup>1, 2</sup></li> </ul> <p style="text-align: center;"><b>Occasional Readers</b></p> <p>Occasional readers are not required to meet the interpreting physician initial qualifications or continuing experience requirements. However, the reads of all occasional readers combined should not exceed 5% of the total volume of reads per practice and per modality. There must be an active written review process in place at the institution for occasional readers based on each institution's credentialing requirements. Validation of this process will take place during any site visit by the ACR.</p>	<ul style="list-style-type: none"> <li>Completion of an accredited specialty residency, and</li> <li>200 hours of Category I continuing medical education (CME) in the performance as well as interpretation of CT in the subspecialty where CT reading occurs, and</li> <li>Interpretation and reporting of 500 cases during the past 36 months in a supervised situation.<sup>2</sup></li> </ul>
<b>Continuing Experience</b>	<p>Upon renewal, physicians reading CT examinations must meet the following: Currently meets the Maintenance of Certification (MOC) requirements for ABR (See <a href="#">ABR MOC</a>)</p> <p style="text-align: center;"><b>OR</b></p> <p>Physicians reading CT examinations across multiple organ systems must have read 200 exams over the prior 36 months.<sup>3</sup></p> <p style="text-align: center;"><b>OR</b></p> <p>For physicians reading organ system specific exams (i.e., body, abdominal, musculoskeletal, head) across multiple modalities they must read a minimum of 60 organ system specific CT exams in 36 months. However, they must read a total of 200 <i>cross-sectional imaging</i> (MRI, CT, PET/CT and ultrasound) studies over the prior 36 months.<sup>3</sup></p>	
<b>Continuing Education</b>	<p>Upon renewal must meet one of the following:</p> <ol style="list-style-type: none"> <li>Currently meets the Maintenance of Certification (MOC) requirements for the ABR (See <a href="#">ABR MOC</a>)</li> </ol> <p style="text-align: center;"><b>OR</b></p> <ol style="list-style-type: none"> <li>Completes 150 hours (that includes 75 hours of Category 1 CME) in the prior 36 months pertinent to the physician's practice patterns (See <a href="#">ACR Guideline</a>)</li> </ol> <p style="text-align: center;"><b>OR</b></p> <ol style="list-style-type: none"> <li>Completes 15 hours CME in the prior 36 months specific to the imaging modality or organ system (half of which must be category 1)</li> </ol>	

<sup>1</sup> Completion of an accredited radiology residency in the past 24 months will be presumed to be satisfactory experience for the reporting and interpreting requirement.

<sup>2</sup> The supervising interpreting physician reviews, discusses, and confirms the diagnosis of the physician being supervised. The supervising interpreting physician does not have to be present at the time of initial interpretation. However, the supervising physician must review and, if necessary, correct the final interpretation. Supervision may also be accomplished through a formal course that includes a lecture format in addition to all of the following: 1) a database of previously performed and interpreted cases, 2) an assessment system traceable to the individual participant, and 3) direct feedback regarding the responses. Examples of suitable assessment systems are an audience response system, a viewbox or monitor based program or an individual CD-ROM or web-based instruction system.

<sup>3</sup> Double-reading (2 or more physicians interpreting the same examination) is acceptable. Interpreting physicians may also re-interpret a previously interpreted examination and count it towards meeting the continuing experience requirement, as long as he/she did not do the initial interpretation. Examinations that are reviewed and evaluated for RADPEER™ or an alternative physician peer review program may count toward your continuing experience numbers.

Requirements for Physicians Supervising and Interpreting Cardiac CT Examinations		
Qualifications	Radiologists	Other Physicians
<b>Initial</b>	<ul style="list-style-type: none"> <li>Board certification in radiology or diagnostic radiology by: <ul style="list-style-type: none"> <li>ABR,</li> <li>American Osteopathic Board of Radiology,</li> <li>Royal College of Physicians and Surgeons of Canada, or</li> <li>Le College des Medecins du Quebec, and</li> </ul> </li> <li>If board certified <b>before 2008</b>, must also meet the following: <ul style="list-style-type: none"> <li>Supervision, interpretation and/or review and reporting of 75 Cardiac CT examinations within the last 36 months.<sup>4, 5</sup></li> </ul> <p style="text-align: center;"><b>OR (Not Board Certified)</b></p> <ul style="list-style-type: none"> <li>Completion of an Accreditation Council for Graduate Medical Education (ACGME) Radiology Residency Program, AND</li> <li>Have supervised interpretation of 75 cardiac CT cases in the past 36 months<sup>5</sup></li> </ul> <p style="text-align: center;">AND</p> <ul style="list-style-type: none"> <li>Completion of at least 40 hours of Category 1 Continuing Medical Education (CME) in cardiac imaging, including cardiac CT, anatomy, physiology, and/or pathology or documented equivalent supervised experience in a center actively performing cardiac CT.<sup>5</sup></li> </ul> </li> </ul>	<p style="text-align: center;"><b>CARDIOLOGISTS<sup>6</sup> (Cardiac Only)</b></p> <p>Certification in cardiology by the American Board of Internal Medicine with completion of Level 2 training or higher</p> <p><b>Level 2 requirements</b></p> <ul style="list-style-type: none"> <li>Board certification or eligibility, valid medical license, and completion of a 3-month (cumulative) specialty residency or fellowship in Cardiac CT</li> </ul> <p style="text-align: center;">AND</p> <ul style="list-style-type: none"> <li>150 Cardiac CT examinations in which 50 where the candidate is physically present, involved in the acquisition and interpretation of the case,</li> </ul> <p style="text-align: center;">AND</p> <ul style="list-style-type: none"> <li>Completion of 30 hours of courses related to CT in general and/or Cardiac CT in particular</li> </ul> <p><b>Level 3 requirements</b></p> <ul style="list-style-type: none"> <li>Board certification or eligibility, valid medical license, and completion of a 12-month (cumulative) specialty residency or fellowship in Cardiac CT</li> </ul> <p style="text-align: center;">AND</p> <ul style="list-style-type: none"> <li>300 Cardiac CT examination in which 100 where the candidate is physically present, involved in the acquisition and interpretation of the case,</li> </ul> <p style="text-align: center;">AND</p> <ul style="list-style-type: none"> <li>Completion of 60 hours of courses related to CT in general and/or Cardiac CT in particular</li> </ul> <p style="text-align: center;"><b>NUCLEAR MEDICINE PHYSICIANS (Cardiac Only)</b></p> <ul style="list-style-type: none"> <li>Completion of an ACGME approved training program in nuclear medicine</li> </ul> <p style="text-align: center;">AND</p> <ul style="list-style-type: none"> <li>Specific training in CT within an ACGME accredited training program</li> </ul> <p style="text-align: center;">OR</p> <ul style="list-style-type: none"> <li>160 hours of category 1 CME in CT to include, but not limited to: CT physics, recognition of artifacts, safety, instrumentation, and 40 hours specific to cardiovascular CT.</li> </ul> <p style="text-align: center;">AND</p> <ul style="list-style-type: none"> <li>Interpretation and reporting under the supervision of a qualified physician of at least 75 cases of CT of the cardiovascular system during the past 36 months.<sup>5</sup></li> </ul>
<b>Continuing Experience</b>	Upon renewal, radiologists reading Cardiac CT examinations must have read 50 exams over the prior 24-month period. The cardiac examinations interpreted will count toward the overall continuing experience for other CT modules. <sup>7</sup>	<b>Upon renewal, cardiologists reading Cardiac CT examinations must have continuing experience in accordance with level 2 requirements or higher – 50 examinations each year.<sup>7</sup></b>
<b>Continuing Education</b>	Upon renewal, physicians must have earned at least 15 CME in CT (half of which must be category 1) hours in the prior 36-month period and should include CME in Cardiac CT as is appropriate to the physician's practice needs.	Upon renewal, cardiologists must have earned at least 30 hours of coursework in the prior 36 month period in accordance with level 2 requirements.

<sup>4</sup> Board certification and completion of an accredited radiology residency in the past 24 months will be presumed to be satisfactory experience for the reporting and interpreting requirement.

<sup>5</sup> The supervising interpreting physician reviews, discusses, and confirms the diagnosis of the physician being supervised. The supervising interpreting physician does not have to be present at the time of initial interpretation. However, the supervising physician must review and, if necessary, correct the final interpretation. Supervision may also be accomplished through a formal course that includes a lecture format in addition to all of the following: 1) a database of previously performed and interpreted cases, 2) an assessment system traceable to the individual participant, and 3) direct feedback regarding the responses. Examples of suitable assessment systems are an audience response system, a viewbox or monitor based program or an individual CD-ROM or web-based instruction system.

<sup>6</sup> 2005 ACCF/AHA Clinical Competence Statement on Cardiac CT and MR.

<sup>7</sup> Double-reading (2 or more physicians interpreting the same examination) is acceptable. Interpreting physicians may also re-interpret a previously interpreted examination and count it towards meeting the continuing experience requirement, as long as he/she did not do the initial interpretation. Examinations that are reviewed and evaluated for RADPEER™ or an alternative physician peer review program may count toward your continuing experience numbers.

In addition, all physicians interpreting CT examinations must:

- Have completed an accredited diagnostic radiology residency or 80 hours of documented, relevant classroom instruction including diagnostic radiology and radiation safety physics. Otherwise, physicians must demonstrate training in the principles of radiation protection, the hazards of radiation exposure to both patients and radiological personnel, and appropriate monitoring requirements.
- Be thoroughly acquainted with the many morphologic and pathophysiologic manifestations and artifacts demonstrated on computed tomography. Additionally, supervising physicians should have appropriate knowledge of alternative imaging methods.
- Be knowledgeable of patient preparation, and training in the recognition/treatment of adverse effects of contrast materials<sup>8</sup> for these studies.
- Be responsible for reviewing all indications for the examination; specifying the use, dosage, and rate of administration of contrast agents<sup>8</sup>, specifying the imaging technique, including appropriate windowing and leveling; interpreting images; generating written reports; and maintaining the quality of both the images and interpretations.
- Be familiar with the meaning and importance to the practice of CT of: total radiation dose to the patient, exposure factors, conscious sedation principles that are performed in the practice, and post-processing techniques and image manipulation on work stations.

In addition to being in compliance with the interpreting physician qualifications stated above, the **supervising physician** also has the following responsibilities:

- Develop, implement and enforce policies and procedures related to radiation protection, the hazards of radiation exposure to both patients and radiological personnel, and appropriate monitoring requirements.
- Develop, implement and enforce policies and procedures to address safety issues, including contrast use and sedation, and reduce exposure as much as reasonably possible for pediatric patients.
- Ensure that a physician is present and immediately available when contrast is administered to patients.
- Develop, implement and enforce policies and procedures to identify pregnant or potentially pregnant patients.
- Develop, implement and enforce policies and procedures consistent with ACR's Position Statement on Quality Control and Improvement, Safety, Infection Control, and Patient Concerns.
- Be responsible for assuring compliance with the recommendations of the medical physicist.
- Be responsible for the oversight and submission of all materials, including clinical and phantom images, as appropriate, quality control data and such other information as required by the CT Accreditation Program.
- Be responsible for notifying the ACR within 15 days of any changes in imaging equipment (units) or changes in the use of equipment that could affect clinical or phantom images (i.e., in CT an adults-only approved scanner being used to scan pediatric patients).
- Ensure that all accreditation criteria are met and that the same standard of performance is maintained during the 3-year accreditation period.
- Provide immediate written notice to the ACR upon the termination of any accredited services provided by the Practice Site or a change in ownership of the operating location.
- Ensure that all physicians providing services at this facility are actively participating in a formal peer review program that meets the stated accreditation requirements.

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<sup>8</sup> See the ACR Practice Guideline for the Use of Intravascular Contrast Media.

## Radiologic Technologist

Qualifications	Radiological Technologist
Initial	<ul style="list-style-type: none"> <li>• ARRT certified and currently registered and/or unrestricted state license<sup>9</sup>, and</li> <li>• Documented training and experience in CT, and</li> <li>• Documented training and experience in operating CT equipment and radiation physics and protection.</li> <li>• Passing the advanced examination for CT certification is recommended.</li> </ul>
Continuing Education	<ul style="list-style-type: none"> <li>• Registered technologists               <ul style="list-style-type: none"> <li>– In compliance with the CE requirements of their certifying organization for the imaging modality in which they perform services</li> <li>– CE includes credits pertinent to the technologist's ACR accredited clinical practice</li> </ul> </li> <li>• State licensed technologists               <ul style="list-style-type: none"> <li>– 24 hours of CE every 2 years</li> <li>– CE is relevant to imaging and the radiologic sciences, patient care</li> <li>– CE includes credits pertinent to the technologist's ACR accredited clinical practice</li> </ul> </li> <li>• All others               <ul style="list-style-type: none"> <li>– 24 hours of CE every 2 years</li> <li>– CE is relevant to imaging and the radiologic sciences, patient care</li> <li>– CE includes credits pertinent to the technologist's ACR accredited clinical practice</li> </ul> </li> </ul>

## Medical Physicist

The qualified medical physicist:

- Must be familiar with the principles of imaging physics and of radiation protection; the guidelines of the National Council on Radiation Protection and Measurements; laws and regulations pertaining to the performance of the equipment being tested; the function, clinical uses, and performance specifications of the imaging equipment; and calibration processes and limitations of the instruments used for performance testing.
- The qualified medical physicist should be available for consultation regarding patient dosimetry issues within a reasonable period of time.

The qualified medical physicist is responsible for the conduct of all surveys of the CT equipment. The medical physicist may be *assisted* by properly trained individuals in obtaining data. These individuals must be approved by the medical physicist in the techniques of performing tests, the function and limitations of the imaging equipment and test instruments, the reasons for the tests, and the importance of the test results. The medical physicist *must be present* during the surveys; review, interpret, and approve all data; and provide a report of the conclusions *with his/her signature*. Effective **January 1, 2010**, all medical physicists providing these services *must* meet the following minimum criteria:

<sup>9</sup> Except where prohibited by state law or regulation, for initial accreditation and accreditation renewal, registered nuclear medicine technologists who have had appropriate training in CT with documentation as defined by the supervising physician at the site will be considered to be qualified to perform PET/CT exams. However, they are not considered qualified to perform stand-alone diagnostic CT. Registered CT technologists who have appropriate training (see <http://www.nmtcb.org/specialty/petExam.php>) in nuclear medicine are also considered qualified to do PET/CT. However, they are not considered qualified to perform stand-alone PET or other nuclear medicine studies. At the time of any site survey by the ACR, the site must provide documentation of training and experience. At the time of accreditation renewal, all CT technologists must have certification from NMTCB.

Qualifications	Medical Physicist
<b>Initial</b>	<p style="text-align: center;"><b><u>Board Certified</u></b></p> <p>Certified in Diagnostic Radiological Physics or Radiological Physics by the American Board of Radiology; in Diagnostic Imaging Physics by the American Board of Medical Physics; or in Diagnostic Radiology Physics by the Canadian College of Physicists in Medicine</p> <p style="text-align: center;"><b>OR</b></p> <p style="text-align: center;"><b><u>Not Board Certified in Required Subspecialty</u></b></p> <ul style="list-style-type: none"> <li>• Graduate degree in medical physics, radiologic physics, physics, or other relevant physical science or engineering discipline from an accredited institution, <b>and</b></li> <li>• Formal coursework in the biological sciences with at least <ul style="list-style-type: none"> <li>– 1 course in biology or radiation biology, and</li> <li>– 1 course in anatomy, physiology, or similar topics related to the practice of medical physics</li> </ul> </li> <li>• 3 years of documented experience in a clinical CT environment</li> </ul> <p style="text-align: center;"><b>OR</b></p> <p style="text-align: center;"><b><u>Grandfathered</u></b></p> <p>Conducted surveys of at least 3 CT units between January 1, 2007 and January 1, 2010</p>
<b>Continuing Experience</b>	Upon renewal, 2 CT unit surveys in prior 24 months
<b>Continuing Education</b>	Upon renewal, 15 CEU/CME (1/2 Cat 1) in prior 36 months (must include credits pertinent to the accredited modality)

## Equipment

CT equipment specifications and performance shall meet state and federal requirements and applicable ACR Practice Guidelines and Technical Standards.

## Quality Control

A quality control (QC) program must be established and implemented under the supervision of a qualified medical physicist. Initial performance testing (acceptance testing) is required upon installation.

## Annual Medical Physicist Survey

The medical physicist must evaluate the performance of each CT unit at least annually. ACR realizes that surveys cannot usually be scheduled exactly on the anniversary date of the previous survey. Therefore, a period of up to 14 months between surveys is acceptable. This evaluation should include, but not be limited to, the following:

- Alignment light accuracy
- Alignment of Table to gantry
- Table/gantry tilt
- Slice localization from scanned projection radiograph (localization image)
- Table incrementation accuracy
- Slice thickness
- Image quality
  1. High-contrast (spatial) resolution
  2. Low-contrast resolution
  3. Image uniformity
  4. Noise
  5. Artifact evaluation
- CT number accuracy and linearity
- Other tests as required by state or local regulations
- Display devices
  1. Video display
  2. Hard-copy display
- Dosimetry
  1. Computed tomography dosimetry index (CTDI)
  2. Patient radiation dose for representative examinations
- Safety evaluation
  1. Visual inspection
  2. Audible/visual signals
  3. Posting requirements
  4. Scattered radiation measurements

## Continuous Quality Control

A continuous quality control (QC) program must be established for all CT units with the assistance of a qualified medical physicist. The qualified medical physicist should determine the frequency of each test and who should perform it based on the facility and CT usage. An on-site radiological technologist should be identified to be responsible for conducting routine quality control.

The continuous QC program should include, but not be limited to, the following:

- Image quality
  1. High-contrast (spatial) resolution
  2. Low-contrast resolution
  3. Image uniformity
  4. Noise
  5. Artifact evaluation
- Alignment light accuracy
- Slice thickness
- CT number accuracy
- Display devices

All quality control testing must be carried out in accordance with written procedures and methods. Preventive maintenance must be scheduled, performed, and documented by a qualified service engineer on a regular basis. The results of the QC program must be monitored annually by the qualified medical physicist. If the results of a QC test fall outside the control limits, corrective action should be taken. A qualified medical physicist should be available to assist in prescribing corrective actions for unresolved problems. All deficiencies must be documented and service records maintained by the CT facility.

## Quality Assurance

Policies and procedures related to quality, patient education, infection control, and safety should be developed and implemented in accordance with the ACR Policy on Quality Control and Improvement, Safety, Infection Control and Patient Education Concerns. The site will have a quality assurance program that incorporates the following two elements:

## Physician Peer-Review Requirements

Examinations should be systematically reviewed and evaluated as part of the overall quality improvement program at the facility. Monitoring should include evaluation of the accuracy of interpretation as well as the appropriateness of the examination. Complications and adverse events or activities that may have the potential for sentinel events must be monitored, analyzed and reported as required, and periodically reviewed in order to identify opportunities to improve patient care. These data should be collected in a manner that complies with statutory and regulatory peer-review procedures in order to ensure the confidentiality of the peer-review process.<sup>10</sup>

All sites initially applying for ACR accreditation and all sites renewing their accreditation must actively participate in a physician peer review program that performs the following functions:

- Includes a double reading (2 MDs interpreting the same study) assessment.
- Allows for random selection of studies to be reviewed on a regularly scheduled basis.
- Exams and procedures representative of the actual clinical practice of each physician.
- Reviewer assessment of the agreement of the original report with subsequent review (or with surgical or pathological findings).
- A classification of peer review findings with regard to level of quality concerns (One example is a 4-point scoring scale).
- Policies and procedures for action to be taken on significant discrepant peer review findings for the purpose of achieving quality outcomes improvement.
- Summary statistics and comparisons generated for each physician by imaging modality.
- Summary data for each facility/practice by modality.

There are several options available to meet this requirement. Sites may develop their own peer review program, use a vendor product or RADPEER, a peer review process developed by the ACR.

For information about RADPEER or eRADPEER please visit the ACR web site at:  
[http://www.acr.org/SecondaryMainMenuCategories/quality\\_safety/radpeer.aspx](http://www.acr.org/SecondaryMainMenuCategories/quality_safety/radpeer.aspx).

## Appropriateness/Outcome Analysis

The results of an appropriateness/outcomes analysis and the actions taken to correct any deficiencies should be maintained as quality assurance records at the facility. Policy and procedures must be in place to look at the diagnostic accuracy, and complication rate and outcome of CT-guided interventional procedures. Documentation may be requested as part of an on-site survey.

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<sup>10</sup> 2005 ACR Guidelines and Technical Standards. ACR Position Statement on Quality Control and Improvement, Safety, Infection Control, and Patient Education Concerns. Page IV.

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# Accreditation Testing

## Clinical Images

The clinical examinations will be of the head/neck, chest, cardiac and abdomen regions. Three to four examinations and your *facility's protocol* for that examination must be submitted from each unit. The exact number of examinations depends on the number of modules for which the unit is used. If the unit is a specialty unit, and does not perform examinations from all four modules, at least three exams are still required from that unit.

The facility may choose which examinations it will submit for accreditation (see selection list below). At least one of the examinations chosen for each unit must be a specialized examination. For units applying for cardiac, at least one CTA examination must be submitted, unless the unit is only used for patients 15 years of age and under, in which case the pediatric cardiac examination is required for the cardiac module. *Asterisks denote the specialty examinations.* If the unit is also used for pediatric patients, at least one of the examinations must also be from a child between the ages of 0 and 15. *Pediatric images should clearly reflect that the site has taken into account the child's age and body habitus in selecting the scanning parameters and contrast dosage. Please refer to the "FDA Public Health Notification: Reducing Radiation Risk from Computed Tomography for Pediatric and Small Adult Patients." All of the FDA health notifications can be found on the World Wide Web at <http://www.fda.gov/cdrh/safety.html>.*

Facilities may not submit images performed on models or volunteers. All clinical images **must** be from actual patients. **Use of volunteers or models may result in withholding, denial or revocation of accreditation.** Patient films will be returned with the final report. *The reviewers assume that the images submitted are examples of your best work. All images must demonstrate adequate positioning, film contrast and exposure level, resolution, noise, patient and facility identification, and lack of artifacts.*

Adult Examination Choices			
Head/Neck	Chest	Abdomen	Cardiac
<ul style="list-style-type: none"> <li>• Head (such as for headaches and to exclude neoplasm)</li> <li>• Temporal bones*</li> <li>• Cervical spine for known or suspected fracture*</li> </ul>	<ul style="list-style-type: none"> <li>• Chest (such as for evaluation of known or suspected lung cancer or cough)</li> <li>• Suspected pulmonary embolus*</li> <li>• High-resolution CT of chest (HRCT) for evaluation of diffuse lung disease*</li> <li>• Assessment of possible aortic dissection*</li> </ul>	<ul style="list-style-type: none"> <li>• Abdomen (such as for detection of possible liver metastases or lymphoma)</li> <li>• Known cirrhosis (R/O hepatoma)*</li> <li>• Evaluation of <b>known</b> renal mass (including ROI measurements)*</li> <li>• Evaluation of a patient with suspected pancreatic carcinoma*</li> </ul>	<ul style="list-style-type: none"> <li>• Calcium Scoring (No more than one exam)</li> <li>• CTA (Required)*</li> <li>• Pulmonary Vein Mapping</li> <li>• Cardiac Function and Morphology, such as, for tumor, congenital heart disease, aortic valve or cardiomyopathy</li> </ul>

Pediatric Examination Choices			
Head/Neck	Chest	Abdomen	Cardiac
<ul style="list-style-type: none"> <li>• Pediatric head CT (such as for headaches, seizures, or suspected mass)</li> <li>• Pediatric sinus for infection</li> <li>• Pediatric cervical spine*</li> <li>• Pediatric temporal bones*</li> </ul>	<ul style="list-style-type: none"> <li>• Pediatric chest (such as for detection of metastatic disease, trauma, infection, or cough)</li> <li>• Pediatric high-resolution CT of chest (HRCT) for evaluation of diffuse lung disease*</li> </ul>	<ul style="list-style-type: none"> <li>• Pediatric abdomen (such as for blunt trauma, acute abdominal pain, or infection)</li> <li>• Pediatric CT for adrenal/renal mass*</li> </ul>	<ul style="list-style-type: none"> <li>• Pediatric Cardiac such as for Congenital Disease</li> </ul>

See the table below for the number of examinations required based on the number of modules your site selected on the application:

Number of modules on application	Number of examinations per module	Total exams per unit
One module	Three examinations are required, at least one of which must be a specialty examination. If adult and pediatric, at least one of the examinations must be a pediatric examination.	Three
Two modules	Select one specialty examination from either module and one routine examination from each module. If adult and pediatric, at least one of the examinations must be a pediatric examination.	Three
Three modules	Select one specialty examination from <i>one</i> module, <i>and</i> select one examination from <i>each</i> of the other two modules. If adult and pediatric, at least one of the examinations must be a pediatric examination.	Three
Four modules	The CTA examination from the cardiac module is required in addition to, one examination from each of the other three modules. If adult and pediatric, at least one of the examinations must be a pediatric examination.	Four

## Exam Identification and Labeling

Required Identification Labeling for Each Adult or Pediatric CT Image	
Identifying Demographic Data	Scan and Display Parameters
<ul style="list-style-type: none"> <li>• Patient's first and last name</li> <li>• Medical record number</li> <li>• Institution name</li> <li>• Date and time of examination</li> <li>• Date of birth or age of patient</li> <li>• Gender of patient</li> </ul>	<ul style="list-style-type: none"> <li>• Anatomic orientation label</li> <li>• mA/kV</li> <li>• Table speed (pitch)</li> <li>• Scan time</li> <li>• Series number (if applicable) or image number</li> <li>• Size scale</li> <li>• Slice thickness</li> <li>• Table position</li> <li>• Window width/level</li> </ul>

Recommended Identification and Labeling for CT	
On each image	On at least one image of the exam
<ul style="list-style-type: none"> <li>• Contrast use</li> <li>• Field of view</li> <li>• Reconstruction algorithm</li> </ul>	<ul style="list-style-type: none"> <li>• Technologist's identification number, name, or initials</li> </ul>

## Clinical Protocols

The typical scanning protocols for the submitted images will be required for accreditation; the submitted clinical images should reflect use of those protocols. The facility should submit its protocols in the format that it normally uses on site, but they need to be readily understandable by a reviewer charged with correlating those protocols with the submitted images.

A typical protocol should include at least the following elements:

- Indication
- Scanner settings
- Phase of respiration
- Slice thickness
- Table speed (pitch)
- Reconstruction algorithm
- Reconstruction interval
- Cranio-caudal extent
- IV contrast (with injection rate and scan delay)
- Necessity for preliminary non-contrast scans.

There are many published sources of information on scanning protocols and procedures in ACR documents and in radiological journals and textbooks.

## Phantom Testing: Image Quality and Dose

A single ACR phantom (Gammex 464) must be used for all units accredited at a facility. When the testing materials are sent, the applicant will receive instructions on how to order the phantom directly from the manufacturer.

Specific performance criteria evaluated using the phantom include:

- CT number accuracy
- Low-contrast resolution
- Image uniformity

***A complete set of phantom images, along with dose measurements, from every CT unit at the facility must be submitted.***

For accreditation purposes, it is necessary for your medical physicist to perform CTDI testing on every CT unit at your facility. Using these CTDI measurements, your physicist will be able to calculate various descriptors of dose for your adult head, pediatric head (1 year old), pediatric abdomen (5 year old, ~40 lbs.), and adult abdomen examinations (depending on the modules and patient types performed on that unit). These calculations will use the average technique factors provided by your facility. You can access the appropriate calculation spreadsheet at [http://www.acr.org/accreditation/computed/qc\\_forms.aspx](http://www.acr.org/accreditation/computed/qc_forms.aspx).

In order to be accredited with the ACR, a CT unit must pass both the clinical and phantom image quality tests. The phantom will fail (and, the unit will fail ACR accreditation) if the dose from the CT unit exceeds the pass/fail criteria. The facility must repeat the entire phantom portion of the accreditation testing, *and pass*, for the unit to be granted accreditation.

The ACR has also updated the dose reference levels for the phantom submission. Reference levels help identify situations where doses are above expected values and should be investigated. Units exceeding these reference levels (but remaining below the pass/fail criteria) will **not** fail accreditation. However, even if the unit is granted accreditation, the ACR strongly urges the facility to consult with its medical physicist to determine if it is possible to reduce the examination dose without sacrificing image quality. Corrective action for exceeding dose reference values will be checked by a survey team if your facility is chosen for a validation on site survey.

These new pass/fail criteria and reference levels are based on a detailed analysis of the dose data and image quality collected during the first three years of the accreditation program. The new requirements and recommendations consider the amount of radiation necessary for adequate image quality. Because multislice CT units are more prevalent since the accreditation program started, the new dose criteria and levels also incorporate a more appropriate dose descriptor (CTDI<sub>vol</sub>). These changes are being made to help facilities reduce unnecessary radiation dose to patients undergoing CT examinations while still maintaining sufficient radiation levels necessary for appropriate diagnoses. *Currently, there is no reference level or pass/fail criterion for Pediatric Head. Data from this portion of the phantom submission will be used in the future to create a reference level and pass/fail criterion for this examination.*

**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 Abdomen (5 year old)	25	20

## Accreditation Fees

Checks should be made payable to the American College of Radiology (include modality accreditation ID#, if available). American Express, MasterCard, and Visa are accepted. The charge for the phantom is paid directly to the manufacturer.

Accreditation Fees	
Cycle	Fees
<b>Accreditation</b> (Initial cycle and renewal)	\$2400 for first unit up to three modules \$2500 for first unit for all four modules \$2300 each additional unit at one site location up to three modules \$2400 for each additional unit for all four modules
<b>Repeat</b>	\$800 per scanner for clinical or phantom images \$1600 per scanner if repeating both
<b>Reinstate/Corrective Action Plan</b>	\$2400 per unit up to three modules \$2500 per unit for all four modules
<b>Add Units (mid cycle)</b> <b>Add Module/Patient Type</b>	\$1600 each unit \$1600 each unit
<b>Replacement Certificate</b>	\$50 per certificate.
<b>Phantom</b>	\$3315 for phantom.  \$321 for carrying case and stand (optional).

*Note: Fees subject to change without notice.*

## For Additional Information

For further information log on to the ACR Web site at [www.acr.org](http://www.acr.org), click on “Accreditation” and click on “Computed Tomography”. A link to “Frequently Asked Questions” is available in the CT menu, along with other useful information about accreditation and many of the program’s forms. To contact the ACR CT Accreditation Program office by phone, dial (800) 770-0145.

## **ACR Practice Guidelines and Technical Standards**

The following ACR Practice Guidelines and Technical Standards are pertinent to achieving and maintaining CT Accreditation. These guidelines and standards form the basis of the accreditation program.

[ACR Practice Guideline for Imaging Pregnant or Potentially Pregnant Adolescents and Women with Ionizing Radiation](#)

[ACR Practice Guideline for the Use of Intravascular Contrast Media](#)

[ACR Practice Guideline for Performing and Interpreting Diagnostic Computed Tomography \(CT\)](#)

[ACR Practice Guideline for the Performance of Computed Tomography \(CT\) of the Brain](#)

[ACR Practice Guideline for the Performance of Computed Tomography \(CT\) of the Extracranial Head and Neck in Adults and Children](#)

[ACR Practice Guideline for the Performance of Computed Tomography \(CT\) of the Spine](#)

[ACR Practice Guideline for the Performance of Computed Tomography \(CT\) for the Detection of Pulmonary Embolism in Adults](#)

[Practice Guideline for the Performance of High-Resolution Computed Tomography \(HRCT\) of the Lungs in Adults](#)

[ACR Practice Guideline for the Performance of Computed Tomography \(CT\) of the Abdomen and Computed Tomography \(CT\) of the Pelvis](#)

[ACR Technical Standard for Diagnostic Medical Physics Performance Monitoring of Computed Tomography \(CT\) Equipment](#)

[ACR Practice Guideline for Communication of Diagnostic Imaging Findings](#)

[ACR Practice Guideline for the Performance and Interpretation of Cardiac Computed Tomography \(CT\)](#)