

CT Accreditation Program Requirements



OVERVIEW	2
MANDATORY ACCREDITATION TIME REQUIREMENTS.....	2
WITHDRAWN, ADDED, OR REPLACEMENT UNITS.....	2
PERSONNEL QUALIFICATIONS	3
EQUIPMENT	6
QUALITY CONTROL	6
ANNUAL MEDICAL PHYSICIST SURVEY	6
CONTINUOUS QUALITY CONTROL	7
QUALITY ASSURANCE.....	7
PHYSICIAN PEER-REVIEW REQUIREMENTS	8
APPROPRIATENESS/OUTCOME ANALYSIS.....	8
ACCREDITATION TESTING.....	9
CLINICAL IMAGES	9
EXAM IDENTIFICATION AND LABELING	10
CLINICAL PROTOCOLS.....	10
PHANTOM TESTING: IMAGE QUALITY AND DOSE.....	10
ACCREDITATION FEES.....	12
FOR ADDITIONAL INFORMATION	12
ACR PRACTICE GUIDELINES AND TECHNICAL STANDARDS.....	12

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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 that performs head/neck, chest, or abdomen exams must go through testing for the site to be accredited. A site may apply for head only or body only if the scanner is used only for those body parts. For sites that perform only adult CT scanning, clinical images required for submission will be both basic and specialized examinations in the head/neck, chest, and abdomen regions. For sites that do occasional pediatric scanning 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 exams will have to submit basic and specialized exams tailored to the pediatric population (see selection list under Clinical Images section for all three 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Withdrawn, Added, or Replacement Units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 Consequently, facilities ***must notify the ACR*** if they have permanently ***withdrawn*** (i.e., removed) a unit from service, if they have ***replaced*** that unit with a new one or have ***added*** another unit.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 scanners and follow the procedures above. Facilities are only required to report modifications that change the scanner's model number. If the scanner changes from an adult- or pediatric-only scanner to an adult + pediatric scanner, an additional adult or pediatric exam 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.

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 applies for 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
Initial	<ul style="list-style-type: none"> • Board certification in radiology or diagnostic radiology by: <ul style="list-style-type: none"> ○ ABR, ○ American Osteopathic Board of Radiology, ○ Royal College of Physicians and Surgeons of Canada, or ○ Le College des Mediciens du Quebec, and • Supervision and/or performance of, as well as interpretation (and/or review) and reporting of, 300 CT examinations in the past 36 months.¹ <li style="text-align: center;">OR • Completion of an accredited diagnostic radiology residency, and • Performance of, as well as interpretation and reporting of, 500 CT examinations in the past 36 months.¹ 	<ul style="list-style-type: none"> • Completion of an accredited specialty residency, and • 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 • Interpretation and reporting of 500 cases during the past 36 months in a supervised situation.
Continuing Experience	Physicians reading CT examinations must have read an average of 9 exams per month over the prior 36-month period.	
Continuing Education	Physicians must have earned at least 15 CME in CT (half of which must be category 1) hours in the prior 36-month period.	

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

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 materials² for these studies.
- Be responsible for reviewing all indications for the examination; specifying the use, dosage, and rate of administration of contrast agents,² 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.

² See the ACR Practice Guideline for the Use of Intravascular Contrast Media.

- Ensure that all physicians providing services at this facility are actively participating in a formal peer review program that meets the stated accreditation requirements.

Radiologic Technologist

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

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:

Qualifications	Medical Physicist
Initial	<p style="text-align: center;"><u>Board Certified</u></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;">OR</p> <p style="text-align: center;"><u>Not Board Certified in Required Subspecialty</u></p> <ul style="list-style-type: none"> • Graduate degree in medical physics, radiologic physics, physics, or other relevant physical science or engineering discipline from an accredited institution, and • Formal coursework in the biological sciences with at least <ul style="list-style-type: none"> - 1 course in biology or radiation biology, and - 1 course in anatomy, physiology, or similar topics related to the practice of medical physics • 3 years of documented experience in a clinical CT environment <p style="text-align: center;">OR</p> <p style="text-align: center;"><u>Grandfathered</u></p> <p>Conducted surveys of at least 3 CT units between January 1, 2007 and January 1, 2010</p>
Continuing Experience	2 CT unit surveys in prior 24 months
Continuing Education	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. 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.³

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.

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.

³ 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, and abdomen regions. One examination from each of the *three categories* and your *facility's protocol* for that examination must be submitted from each scanner. If a scanner does not perform all three examinations, i.e., a specialty scanner, the site must provide a description of the scanner and a signed attestation stating the scanner will not be used for other examinations. If the scanner is a specialty scanner, three exams are still required from that scanner.

The facility may choose which examinations it will submit for accreditation (see selection list below). At least one of the examinations chosen for each scanner must be a specialized examination. ***Asterisks denote the specialty examinations.*** If the scanner is also used for pediatric patients, 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>.***

Sites 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.***

Required Images for CT Accreditation		
Adult Examination Choices		
Head/Neck	Chest	Abdomen
<ul style="list-style-type: none"> • Head (such as for headaches and to exclude neoplasm) • Temporal bones* • Cervical spine for known or suspected fracture* 	<ul style="list-style-type: none"> • Chest (such as for evaluation of known or suspected lung cancer or cough) • Suspected pulmonary embolus* • High-resolution CT of chest (HRCT) for evaluation of diffuse lung disease* • Assessment of possible aortic dissection* 	<ul style="list-style-type: none"> • Abdomen (such as for detection of possible liver metastases or lymphoma) • Known cirrhosis (R/O hepatoma)* • Evaluation of known renal mass (including ROI measurements)* • Evaluation of a patient with suspected pancreatic carcinoma*
Pediatric Examination Choices		
Head/Neck	Chest	Abdomen
<ul style="list-style-type: none"> • Pediatric head CT (such as for headaches, seizures, or suspected mass) • Pediatric sinus for infection • Pediatric cervical spine* • Pediatric temporal bones* 	<ul style="list-style-type: none"> • Pediatric chest (such as for detection of metastatic disease, trauma, infection, or cough) • Pediatric high-resolution CT of chest (HRCT) for evaluation of diffuse lung disease* 	<ul style="list-style-type: none"> • Pediatric abdomen (such as for blunt trauma, acute abdominal pain, or infection) • Pediatric CT for adrenal/renal mass*

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"> • Patient's first and last name • Medical record number • Institution name • Date and time of examination • Date of birth or age of patient • Gender of patient 	<ul style="list-style-type: none"> • Anatomic orientation label • mA/kV • Table speed (pitch) • Scan time • Series number (if applicable) or image number • Size scale • Slice thickness • Table position • Window width/level

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

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 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 scanners 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:

- Slice thickness and positioning
- CT number accuracy
- Low-contrast resolution

- High-contrast (spatial) resolution
- Image uniformity

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

For accreditation purposes, it is necessary for your medical physicist to perform CTDI testing on every CT scanner at your facility. Using these CTDI measurements, your physicist will be able to calculate various descriptors of dose for your adult head, pediatric abdomen (5 year old), and adult abdomen examinations. These calculations will use the average technique factors provided by your site. You can access the appropriate calculation spreadsheet at 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 exam 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 scanners are more prevalent since the accreditation program started, the new dose criteria and levels also incorporate a more appropriate dose descriptor (CTDI_{vol}). 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.

ACR CT Accreditation Dose Pass/Fail Criteria and Reference Levels

Examination	Pass/Fail Criteria	Reference Levels
	CTDI _{vol} (mGy)	CTDI _{vol} (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
Accreditation (Initial cycle and renewal)	\$2400 for first unit. \$2300 each additional unit at one site location.
Repeat	\$800 per scanner for clinical or phantom images. \$1600 per scanner if repeating both.
Reinstate/Corrective Action Plan	\$2400 per unit
Add Units (mid cycle)	\$1400 each unit
Replacement Certificate	\$50 per certificate.
Phantom	\$3205 for phantom. \$445 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, 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 \(CT\)](#)

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[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](#)