I'm not a robot

Acr nuclear medicine quality control manual

Data collection and image preparation must adhere to phantom guidelines. Failure to follow instructions may result in resubmission or testing failure. Note: Specialty scanners might not meet image acquisition parameters, so consult the ACR for guidance. Breast imaging units should use small FOV requirements and position the phantom at a 45-degree angle to visualize all quadrants. Common reasons for image rejection include: The ACR-approved SPECT phantom is used for nuclear medicine quality control. For planar and SPECT cameras, an ACR-approved phantom is required for evaluating image quality. The phantom has a cylindrical shape with internal dimensions of 18.6 cm in height and 20.3 cm in diameter. It contains acrylic rods and solid spheres arranged in pie-shaped patterns. The Data Spectrum Small SPECT phantom is also approved by the ACR. The phantom is a cylinder with an internal length of 15 cm and diameter of 13.9 cm. It has acrylic rods and solid spheres arranged in a pie-shaped pattern. To complete accreditation, one set of Site Scanning Data Forms and pertinent worksheets must be completed for each camera system undergoing testing. Phantom requirements vary by module, but all applicants must submit intrinsic or system flood field images using Tc-99m, Co-57, Tl-201, Ga-67/In-111 isotopes (if applicable). Module 1 (Planar Imaging Only) has specific image submission requirements for planar uniformity and spatial resolution. For accreditation purposes, only intrinsic or system spatial resolution images must be submitted. The phantom used for this data is the four-quadrant bar phantom. Smallest bars should be between 2 and 3 mm. For applicants requesting accreditation for Module 1 only, planar images acquired with ACR SPECT phantom are acceptable in lieu of the four-quadrant bar phantom. However, for camera systems seeking accreditation for Planar Module only, follow the Planar Only protocol. Submit images for all detectors on systems with more than one detector. Plan acquisitions to minimize time required. If using Ga-67 or In-111 isotopes, a single submission is sufficient. If performing less than 25 exams using Tc-99m, Ga-67, and In-111 in a year, you do not need to apply for these isotopes. For accreditation in SPECT Module or Nuclear Cardiology Module, perform and submit both planar and SPECT information for review. Only ACR-approved phantoms from Data Spectrum can be used without permission. The recommended activity for the Deluxe flanged phantom is 10-20 mCi Tc-99m, while the Small flangeless Jaszczak phantom requires 5-15 mCi Tc99m. The size of the rods is decreasing, and the sphere diameters must be consistent with the listed worksheets. The reviewers will use this information to accurately evaluate the images. Take high-quality images on your system within the provided guidelines, and make sure all settings are documented. All ACR-approved SPECT systems should undergo regular testing, including semiannual or quarterly evaluations using a phantom described above. For multiple detectors, planar images must be submitted for each detector. Refer to the SPECT Imaging section below for specific cameras that acquire only SPECT images. SITES ARE REQUIRED TO SUBMIT: - Tc-99m SPECT phantom images - Planar uniformity and spatial resolution images using Tl-201, Ga-67, and/or In-111 isotopes Assume a rate of 28,000 counts per second and 120 views. Round time up to the next whole number if greater than 0.5, down if less than 0.5. If the system has two detectors, the total acquisition time will be half that for a single detector; with three detectors, it will be one-third of a single detector's time. Evaluate images based on uniformity, noise, and artifacts, using planar images and reconstructed tomographic sections. For SPECT systems, evaluate spatial resolution by identifying the smallest bars in a resolution phantom or the smallest "cold" rods in an ACR-approved phantom. Collimator type is considered when evaluating spatial resolution and image contrast. Maintain a documented quality control program and comply with testing frequencies outlined in the 2024 ACR NM Quality Standards for all accredited facilities and applicants. As part of the accreditation process, facilities need to demonstrate compliance with ACR requirements for quality control (QC). This includes providing documentation showing compliance with all QC processes, including recent inspection results and written responses to any noted violations. Facilities also need to demonstrate compliance by performing acceptance testing on systems upon installation, as well as annual physics surveys on each nuclear medicine unit. These tests should be comprehensive and consistent with current practice. The ACR realizes that schedules may not always align exactly with the anniversary date of the previous survey, so a period of up to 14 months between surveys is acceptable. The test results must be reviewed by a qualified medical physicist (QMP) and documented in an annual survey report. Additionally, the QMP should meet with the supervising physician and QC technologist to review the results and recommend any necessary corrective action or repairs. All QC testing must comply with methods outlined in the 2024 ACR NM Quality Control Manual. The annual physics survey should include but not be limited to continuous quality control, preventive maintenance, and performance tests on a quarterly basis. Quality control and testing must be performed on a regular basis by a qualified service engineer. The facility should document all corrective actions taken and maintain accurate records of services performed. It is recommended that quality control (QC) tests follow the ACR Technical Standard for Medical Nuclear Physics Performance Monitoring of PET Imaging Equipment. Data collected from QC tests may lead to future establishment of new requirements. Quarterly testing of each PET system with an appropriate phantom is strongly advised, although semi-annual testing is acceptable. Acceptance tests must be completed before clinical use and are more comprehensive than periodic performance tests. Image quality phantoms are utilized to validate the performance of PET systems, ensuring uniformity in activity concentration throughout and across various phantom materials. Additionally, PET detectors are regularly evaluated for accuracy in detecting radiation and measuring standard uptake values (SUVs). PET technologists are responsible for routine monitoring of PET equipment, as well as performing specific quality control tests on a daily and semi-annual basis. These procedures comply with recommendations from The Joint Commission and regulatory agencies. Furthermore, dose calibrators are used to verify the accuracy of radiation readings, while continuous quality control measures ensure that systems function properly.

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