

AbstractID: 12078 Title: MRI Annual Equipment Performance Evaluation & Acceptance Testing

The ACR MRI Accreditation program requires that sites applying for MRI accreditation submit an annual MRI system performance evaluation performed by a medical physicist or MR scientist. The medical physicist/MR Scientist follows the ACR MRI Quality Control (QC) Manual in order to perform a complete annual system performance evaluation. This evaluation includes an evaluation of the weekly QC performed by a technologist.

This presentation shall review a standard set of tests and procedures that satisfy the ACR compliance testing guidelines. A model program for satisfying the ACR MRI performance standards shall be provided. Steps for setting up the QC Program include determining which tests are appropriate, establishing a mutually agreeable testing frequency, training technologist and other personnel to carry out their portions of the MRI QC program, reviewing artifacts and other problems that result from the test data and documenting corrective actions that are taken. Attention will be paid to specific tests, such as Magnetic Field Homogeneity, in which spectral width, phase-difference and bandwidth difference methods will be discussed and compared. Tests for gradient field linearity (geometric distortion) and radio frequency (RF) coil testing will be presented, including measuring slice thickness accuracy, determining mean and maximum signal-to-noise ratios, ghosting ratios and image intensity uniformity. The relevance, applicability, and performance of each element will be discussed.

A brief discussion of suggested, additional elements that would constitute an Acceptance Testing (AT) program for Magnetic Resonance Imaging devices will conclude the presentation. Tasks under consideration will include comparing equipment received with purchase order specifications, checking environmental conditions of the MRI suite, RF room shielding survey, cryogen consumption, magnetic field stability, magnetic fringe field survey, gradient field strength, eddy current evaluation, evaluation of image acquisition and image processing software and optional features. Individual testing procedures and the rationale for their use will be presented and performance evaluation acceptance criteria will be suggested.

Upon completion of this presentation, participants will understand how to:

- Design Quality Control (QC) Testing and Acceptance Testing (AT) programs for Magnetic Resonance Imaging
- Define the role of the Technologist, equipment service personnel and the clinical medical physicist/MR scientist in this programs.
- Configure the equipment necessary for MRI QC and AT testing.