



Because Quality Matters

ACR ULTRASOUND ACCREDITATION

How Does that Impact Equipment Maintenance

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AMERICAN COLLEGE OF RADIOLOGY PROMOTES CONTINUOUS QUALITY IMPROVEMENT

The American College of Radiology (ACR) was founded in 1963 to promote continuous quality improvement for imaging facilities; their ultrasound accreditation program began in 1995. You can visit the ACR website at www.ACR.org. It has many different standards that facilities must meet and maintain for accreditation. The standards apply to the sonographers performing the exams, the physicians reading the exams, the physical environment the exams are performed in, policies and procedures, and—last but not least—the quality control program for the equipment, which is the focus of this article.

What are the advantages of ACR accreditation? While accreditation is voluntary, imaging facilities with ACR (or similar) accreditation, have a distinct advantage over non-accredited facilities. The first is prestige: A facility can distinguish itself from others by having that seal of approval. The second advantage is financial: Some state agencies and private insurance companies tie reimbursements to facilities with accreditation by ACR or a comparable national group.

Where do we as service and support providers fit into this equation? The quality control standards of the ultrasound systems set by ACR are specific and must be maintained on every ultrasound system within the accredited department at specific intervals to receive accreditation. We stipulate 'within the accredited department' because within a given facility, there are ultrasound systems in many departments—radiology, cardiology, emergency, obstetrics, labor and delivery, oncology, urology, and vascular—but not all departments are accredited. Each organization should determine which specific departments are to be ACR certified. In most facilities, the department that performs breast imaging is the first to become ACR accredited.

The ACR quality control program establishes performance and safety standards. These standards cover imaging in gray scale to establish penetration, sensitivity, and uniformity. Additionally, electrical safety, mechanical operation, cleanliness, vertical/horizontal measurement accuracy, and low-contrast object detectability

The latest American College of Radiology ultrasound accreditation program requirements can be found online at www.acr.org/accreditation.



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are determined. These images and reports must be available for every system in a hard copy format. The standards also address safety and mechanical inspections of the system and transducers. These safety/mechanical inspections are completed using eight standard questions: Are all cables/cords intact? Are transducers intact? Are probes cleaned after each use? Are monitors cleaned? Are air filters cleaned? Do the brakes work? Are the casters securely fastened to the system? Are the peripherals secured to the system?

The standard imaging tests are performed using the same two probes for each inspection. Although all probes should be inspected, ACR mandates that the two most commonly used probes, preferably of different imaging formats (Linear and Curved as an example) be tested using specific imaging parameters. These imaging parameters include depth, output power, transmit zone location and frequency with each inspection to maintain the integrity of test results and to measure changes in system performance over time. In June of 2014, ACR updated the requirements for accreditation adding some new requirements. They added a requirement to measure geometric accuracy. This test uses the ultrasound system calipers to measure known distances between test targets. These measurements are only required in the mechanically scanned directions. The caliper readouts of the distance between these two targets must agree to within 1.5% axially (vertically) and 2% laterally (horizontally). Also new in 2014, is the requirement to test the Primary Interpretation Display Performance. The display characteristics that are evaluated may include gray scale response, luminance calibration, presence of pixel defects, and overall image quality. This primary interpretation display performance test is only required if it is located at the facility where the ultrasound is performed. All test results and corrective actions must be documented. For example, if, during a preventive maintenance (PM) check, you find signal dropout with a transducer, that condition needs to be documented. After the transducer is repaired or replaced, the follow up action also needs to be documented. All maintenance and repair documents must be kept on site in hard copy for inspection. Documenting all Quality Assurance (QA)



and maintenance visits for all of your accredited equipment is required. For more information on the latest requirements, visit www.acr.org and go to the Ultrasound Accreditation Program Requirements link.

If you use the original equipment manufacturer (OEM) or other service provider, do they provide you with the appropriate reports? Does your service provider follow the processes outlined by ACR? To meet several of their requirements, ACR recommends the use of a tissue-mimicking phantom or test object for tests verifying uniformity, geometric accuracy, system sensitivity, and contrast/spatial resolutions. Although using a tissue-mimicking phantom is only a recommendation, performing some of the tests without a phantom is not practical, especially if you are not well versed in operating the particular system you are maintaining. ACR does not specify a specific phantom to be used for these tests but does require it to be serialized. According to the ACR quality control document, the inspection intervals outlined in the quality control document state (emphasis added): “Continual quality control consists of performing the tests previously discussed annually with routine QC testing being performed semiannually.” The routine QC testing consists of the same tests that the Annual inspection consists of. Performing both the annual and routine inspections is crucial to evaluate the system for degradation. Do you know how often the ultrasound equipment within an accredited department is tested? Does your department’s PM /QA program meet ACR standards? Are all ultrasound systems within that department being tested, including portable systems? ACR does not distinguish between standard mainframe type systems and portable systems.

Manufacturer recommended intervals for PM’s have changed in recent years as equipment has evolved. According to the service manual of one major ultrasound manufacturer, it states that due to the system not having any high-wear items, no PM is mandatory. At the same time, this manufacturer recommends performing certain tests and procedures on a regular basis or taking other steps to conform to accrediting standards. What does this mean? Even if your ultrasound system is under warranty or you have a service agreement, there is a good chance you are not in compliance with ACR requirements. The bottom line: It is not the manufacturer’s responsibility to perform semiannual inspections to maintain accreditation. The responsibility rests with the owner of the systems, and we, as service providers and maintenance providers, must assist the departments with the technical portion of the accreditation process.

There are many other accrediting organizations for ultrasound that set quality assurance standards for facilities to meet—American Institute of Ultrasound in Medicine (AIUM), Intersocietal Commission for the Accreditation of Vascular Laboratories (ICAVL), and Intersocietal Commission for the Accreditation of Echocardiography Laboratories (ICAEL), among others. The ICAEL and ICAVL protocols call for annual accuracy testing, using a phantom and a routine cleaning program of the system, probes, and filters, while the AIUM standards call for “regular maintenance and calibration” and “appropriate electrical inspection of the equipment on a regular basis.”

In closing, we have discussed how an ACR accreditation promotes continuous quality improvement. It accomplishes this using specific standards for both the sonographers and physicians, controlling the environment the exams are performed in, and the quality control program for each ultrasound system. These standards cover gray scale imaging, penetration, sensitivity, and uniformity. We must also evaluate the system for mechanical, electrical safety, and vertical/horizontal accuracy. There is a need to inspect and image with all probes but ACR requires specific tests on the two most commonly used probes. These two probes are tested using very specific set up criteria. This is done so that future evaluations of the same two probes will provide consistent results. Understanding each departments’ accreditations allows us as their service providers to comply with the standards. For more information on the latest requirements, visit the appropriate website of the accrediting agency.