AbstractID: 7250 Title: Frontiers in PACS: Acceptance Testing of PACS and Display Workstations

The picture archiving and communication system (PACS), like any other complex technical system in a hospital, is prone to technical problems and operational shortcomings. These problems are particularly challenging if a newly implemented system is not installed properly, or if demands on the system exceed expectations. PAC systems are also extremely costly and often widely integrated with the routine clinical operation. Therefore, when the system does not meet user's expectations or when it malfunctions, it cannot be replaced or fixed without significant inconvenience. Most such potential problems can be prevented if a rigorous and complete acceptance testing is performed before the system is used clinically.

An important component of PACS is the display workstations used to view the images. Soft-copy display devices are prone to image quality degradations that can effect image perception and compromise the overall effectiveness of diagnostic imaging. Acceptance testing and routine quality control of display devices using objective image quality assessment methodologies can prevent potential problems and assure that a loss of display quality does not negatively impact diagnosis.

This course consists of two parts. In the first part, the methods for acceptance testing of PACS are delineated. The reason for and the importance of such testing are outlined. The two main phases of PACS acceptance testing and their various elements are described. Technical and operational factors important to the performance of various components of the system, as well as of the integrated system as a whole, are outlined, and methods for evaluating these factors are described. In the second part, the course focuses on the acceptance testing and quality control of display workstations deployed by PACS. The rationales for display quality assessment are described. The presentation reports the new recommendations of the AAPM Task Group 18 (TG18) for objective performance evaluation of medical image displays. That includes assessment methodologies for display characteristics such as luminance response, luminance uniformity, resolution, noise, veiling glare, ambient light response, color uniformity, geometrical distortions, and display artifacts.

Educational Objectives:

The course seeks to convey the following information:

1. Why, who, and how of PACS acceptance testing
2. Technical and clinical phases of PACS acceptance testing
3. Seven components of PACS technical acceptance testing: pre-installation network performance, installation and basic configuration, single component performance, functionality, functionality under load, overall image quality, and fault tolerance
4. Elements of PACS clinical acceptance testing
5. Engineering specs of modern display devices
6. Tools and patterns for evaluation of display quality

7. Definitions of display quality characteristics
8. Visual and quantitative methods recommended by AAPM TG18 to assess display quality characteristics such as luminance, resolution, noise, glare, uniformity, and distortion
9. Criteria for acceptable display performance
10. Specifics of acceptance testing and quality control of soft-copy displays