

## **Introduction - L. N. Rothenberg**

The era of filmless radiological examinations is upon us. Digital images are manipulated and stored electronically, along with radiologists' reports and other pertinent patient information. In this symposium, a diagnostic radiologist (L.H.S.), a diagnostic imaging physicist (R.L.M.), and a radiation oncology physicist (G.S.M.) will report on their experiences in working with PACS. In addition, guidance to clinical medical physicists in the evaluation of these digital systems will be given by the Chairman of AAPM Task Group 10 on Computed Radiography (J.A.S.), and a medical physicist who supervises an ongoing program of QA/QC for PACS (K.L.J.).

### **A. The Radiologist's Workstation - L. H. Schwartz**

Functional workstation design is critical with the increasing dependence on soft-copy review as PACS technology proliferates. There numerous factors to consider in a Radiologist's workstation related to workflow, ergonomics, and user productivity. Careful integration with Radiology Information Systems (RIS) and Hospital Information Systems (HIS) data, as well as additional dictation functionality all add value for the Radiologist. The use of PACS may improve efficiency. Examples will be illustrated in an oncologic radiology practice setting. Workstation and PACS design and implementation for clinical (non-radiologic needs) will also be discussed.

### **B. The Ongoing Relationship of PACS with RIS, HIS, and Other TLAs - R. L. Morin**

This lecture will describe the relationship between the Radiology Information System, the Hospital Information System, and The Picture Archive and Communication System. The inter-relationship of these three systems is crucial to the implementation of electronic imaging within the radiology department as well as within the institution outside of radiology. Topics discussed will include: the nature and specification of interfaces within radiology, the nature and specification of interfaces in the hospital setting, the flow of data throughout the radiology department and institution, data integrity, technologist's workflow, and the retrieval and distribution of electronic images.

### **C. Clinical Use of EPIDs as Part of a Radiotherapy PACS - G. S. Mageras**

An essential condition for the successful use of Electronic Portal Imaging Devices (EPID) in the clinic is that they be a part of an information management system - sometimes referred to as picture archiving and communication systems (PACS) - specifically designed for radiotherapy departments. This presentation discusses clinical implementation of EPIDs as part of a radiotherapy PACS. We describe ways in which such a system provides the various tools that are needed for portal image acquisition and review, and integrates this information with that from other parts of a patient's treatment, i.e. from treatment simulation, planning, and delivery

### **D. Report on Task Group 10: Acceptance Testing and Quality Control of Computed Radiography Imaging Systems - J. A. Seibert**

Over the past five years a group of interested and dedicated members of the AAPM have contributed their time and effort to Task Group #10 with the goal of producing a document detailing the operation, acceptance protocols, and quality control guidelines for computed radiography (CR) systems. With the increasing deployment of CR in the clinical environment in response to a greater interest in electronic digital imaging, a need exists for the clinical medical physicist to be knowledgeable about these issues. In particular, the differences from screen-film technology and the pertinent operational tests, and results that indicate optimal performance are necessary. Additionally, substantial differences in CR implementation requires attention to unique reader specific attributes, to which manufacturer representation on the work group have participated in the development of critical appendices. The final draft document of TG-10

includes an overview of CR system operation, clinical practice guidelines, generic acceptance procedures and recommended periodic quality control tests, to be reviewed in the presentation.

**E. Quality Assurance and Quality Control of a Picture Archiving and Communication System -**  
K. L. Junck

Quality control in a diagnostic imaging department involves a series of distinct technical procedures which ensure the production of a satisfactory product. Although the product of the radiology department continues to consist of images and reports, the development and implementation of picture archiving and communication systems (PACS) has had a substantial impact on the processes used to acquire and distribute this information. The segmentation of a PACS into four components (image reception, transmission, storage, and display) implies that each component should be specified and evaluated for proper performance. In addition, digital image data is only one aspect of the total patient data management of a health care institution, thus requiring seamless integration with one or more information systems. To maintain high quality in the information provided by the radiology department, efficient and effective quality control practices are essential.

Our institution has developed and implemented a quality assurance (QA) program for an Intensive Care Unit (ICU) mini-PACS operating in eight units. Every image should be properly identified, processed, and oriented; transmitted to the proper ICU viewing station; and have the radiologic interpretation promptly available. The QA program enables us to identify, track, and correct errors which degrade the quality of the information provided. As additional imaging modalities (Emergency Department Computed Radiography system, CT scanners, MRI scanners) have been incorporated into the PACS, this program has grown to encompass the acquisition of these additional images. Data will be presented in this paper describing the types and frequencies of errors discovered in the PACS, as well as issues discovered during implementation.

**Educational Objectives:**

1. To familiarize the audience with the utilization of PACS: electronic display and storage of digital images and accompanying clinical information.
2. To give a perspective on PACS from the point of view of the radiologist, the diagnostic imaging physicist, and the radiation oncology physicist.
3. To provide clinical medical physicists with techniques for acceptance testing and quality assurance of critical components of PACS systems.