

Medical Physicists are frequently called upon to participate in the acquisition of imaging information systems and the implementation of those systems in clinical practice. Physicists involved in research must also be aware of how the fruits of their labors can be integrated into practice in the increasingly electronic imaging enterprise. This tutorial aims to provide foundation and practical knowledge for physicists in these roles.

The successful implementation of an imaging information system — such as a Radiology Information System (RIS) or a Picture Archiving and Communications System (PACS) — involves cultural, business and technical factors which must be brought together into an effective solution. In implementing a solution made from commercial components, one spends one's integration efforts (and funds) on interfaces. When a set of components is purchased as an integrated system, it is not necessary to specify how the components within that proprietary boundary interact. It is *between* proprietary domains that interfaces must be specified, and if the interfaces are not all to be custom-made, there must be standards to which those interfaces conform. In enterprise-wide systems, a multi-vendor environment is inevitable, and standards are an essential tool for multi-vendor implementations. But like any tool, skill in their use may be as important as their intrinsic power.

The DICOM standard is a comprehensive specification for defining and communicating information used in digital imaging. Significantly, DICOM also specifies a format for a vendor's claim of conformance to the DICOM standard. Other standards, particularly Health Level Seven (HL7) provide a framework for communicating text-based patient data in the health care enterprise of which imaging is a part. The principal value of these standards in acquiring commercial solutions is as a method of expressing requirements to vendors. Real-world examples and scenarios will be presented.

The extension of digital information infrastructure to support Computer Aided Diagnosis (CAD) will be illustrated. CAD needs to fit into the operations of the digital radiology department if it is to achieve wide clinical use. The question remains of where CAD shall be placed, whether in source devices, display workstations or special CAD computers. Integrating CAD into digital imaging infrastructure presents a choice: We must either have standards for interfaces between proprietary domains, or we must bind functionality into a single domain and thereby obviate such interface standards. New draft standards supporting both CAD and general-purpose reporting will be described.

Whether for clinical care improvement or translational research, interface standards remain a valuable tool. An understanding of the organizational, political and business context in which they operate enables these tools to be employed profitably.

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Educational Objectives:

1. Prepare attendee for participation in institutional RIS/PACS procurements.
2. Describe purpose and scope of DICOM and HL7 standards.
3. Show how standards are used in procurement and implementation of systems.
4. Illustrate implementation of CAD in departmental image management systems.

Conflict of interest statement:

Support for the speaker's travel to this conference was provided by ADAC Healthcare Information Systems.