The Royal College of Radiologists

Board of the Faculty of Clinical Radiology

DICOM and HL7 standards

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This guidance forms part of a series on the developments in information technology in radiology. This is a fast-moving field and developments are occurring rapidly. Consequently, this guidance will be updated regularly and readers should check regularly that they are using the most up-to-date guidance available.

These guidelines explain, in basic outline, the meaning and significance of the Digital Imaging and Communications in Medicine (DICOM) and Health Language level 7 (HL7) standards, and their relationship to the Integrating the Healthcare Initiative (IHE): all terms with which the radiologist needs to be familiar in today's digital imaging environment.

1. Effective and meaningful communication between information systems from different vendors requires standards. The proper use of such standards protects investments and simplifies upgrade and replacement of equipment by avoiding vendor-specific proprietary systems.

2. The DICOM standard was originally developed in the early 1990s by the American College of Radiology and the National Electrical Manufacturers Association to improve the interoperability between medical imaging systems. This has been developed to produce a successful standard which is widely used in medical imaging.

3. The DICOM standard is particularly useful when specifying components of an imaging system.

4. The weakness of DICOM is the variable application of the standard by different vendors. This has led to integration difficulties in certain circumstances.

5. Communication of patient demographics, test results and information from hospital information systems normally uses a different standard called HL7.

6. For proper integrated workflow, avoiding duplication of data entry, both the radiology information systems (RIS) and the picture archiving and communication systems (PACS) need to be able to use DICOM for communication within the radiology department, and HL7 for external communications.

7. The IHE has successfully achieved interoperability between HL7 and DICOM. IHE strictly defines the use of HL7 and DICOM, overcoming some of the difficulties associated with variable application of these standards.

8. IHE is not a standard itself. IHE represents a process where common workflow processes in radiology using information systems (HIS, RIS and

PACS) are automated. This is performed in a way that enables information systems from different vendors to work together.

9. IHE is based around the concept of ‘profiles’, which are models of recognisable real-life processes and they are given names such as scheduled workflow, patient information reconciliation, consistent presentation of images, key image note, post-processing workflow etc. Specification of these profiles – their presence and enablement – is very useful in the procurement process. More information is available at www.ihe.net Specific information relating to the profiles available on the various modalities and information systems is often available on the vendors’ websites.

10. IHE was initiated at The Radiological Society of North America (RSNA) in 1999. It has grown in annual cycles of specification testing and demonstration. It is now developing outside the radiology domain into areas such as information technology infrastructure, cardiology, laboratories and pathology.

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