



INTEROPERABILITY WHITE PAPER

Interoperability among healthcare imaging and patient information networks is worse than ever. I say never due to the lack of cooperation between major players in the space. Despite years of pleading from customers, the government, and organizations such as IHE (Integrating the Healthcare Enterprise) which is a multinational healthcare initiative that develops and publishes domain -based (for example, radiology, laboratory, etc.) Technical Frameworks (that is, implementation guides) that consist of internationally accepted and vendor-neutral implementations of existing healthcare IT data standards , including but not limited to Health Level 7 (HL7) and Digital Imaging and Communications in Medicine (DICOM), there is little progress in making it all work together.

DICOM (Digital Communication in Medicine) was developed as a standard in 1985 by the ACR (American College of Radiology) for the concerns of radiologists, and NEMA (North American Electronics Manufacturers Association) for the makers of such modalities like CT, MRI, Ultrasound, etc. It was first about standardizing hardware connections to make sure systems could get on the same network. Then it became about protocols that included image structure, commands, network requests, and interface mapping. Without this, HCOs (healthcare Organizations) would have to build and maintain their own custom interfaces which was very expensive. As adoption of these standards increased, it started to become a true standard due to the push of PACS systems to store images from all the different acquisition devices from all different manufacturers. This would come to be known as 'DICOM Compliant'.

To the disappointment of HCOs, the standards became a battleground for OEMs to try and control the environment by making some endpoint communication proprietary to their systems. The finger pointing only ends up with HCOs spending more money and time fixing problems that should not exist according to standardized protocols.

HL7 (Health Level Seven) was developed by consensus in 1987 by SDO (Standards Development Organization). This is a group that helps specific industries understand the problems and how best to address them as an industry. Many companies participated in this consensus to develop HL7 and eliminate the problems of disparate clinical system being unable to communicate with each other. Despite best efforts, there was no standard of coding or information tagging that led to the same problems in DICOM where developers would try to control the environment and systems. With so much flexibility in the standard, coders developed their own internal standards for HCOs to adopt. This led to HL7 offering little or no compliance to HCO systems and created more cost and inefficiencies in healthcare.

IHE was first introduced as a technical framework for all healthcare information at the 1999 RSNA show and in 2000 at HIMSS. More than 80 companies joined immediately and now there are more than 500 participating companies. Technical frameworks have expanded beyond DICOM and HL7 and into security, clinical engineering, pharmacy, medication management, scheduling, patient reconciliation, evidence documentation, and more. Again, despite best efforts, many companies that support and claim to adhere to IHE standards do not employ the technical frameworks required for true interoperability. Much of this is due to the fact the IHE is voluntary participation and not an industry requirement. IHE has helped

considerably in many areas, from standardized vocabulary, reference models, technical data, and hosting Connect-a-thons to verify publicly interoperability among vendors. This has also led to HCOs putting IHE compliance in RFPs to put the onus on the vendors to comply.

For the next few years, the US will be moving forward with the Draft Standard for Trial Use on the EHR-S Functional Model and Standard. Currently, this draft standard provides a national reference model that outlines key direct and supportive care EHR-S functions for the private sector. While IHE does not claim create the definition and all aspects of a complete and interoperable EHR-S, IHE with the national draft standard will be bringing us closer to a true patient information standard that can move through the continuum of care.

However, the realization of the EHR-S is not that simple. For example, other initiatives are in process to create a nationally accepted, common data set of patient information that can be electronically passed from one clinician to the next when a patient is transferred to a different caregiver or is referred to a different facility or HCO. Identifying common data sets, as well as the method of transmission are key considerations for another standards dilemma known as portability. Portability surrounds the patients as well as the health care provider to follow the continuum of care in all aspects from cradle to grave. In essence, this is about ease of access, sharing, keeping, maintaining and moving data for patients. This portability leads to better patient care through clinical support decision making and understanding the holistic view of the patient history and prior care provided.

IHE has begun to get involved in meeting some of the functional requirements of portable EHR-S, such as being document-centric and document content-generic and requiring the distributed exchange of information across the enterprise. For example, IHE has proposed that its IT Infrastructure Technical Framework leverages existing healthcare IT data standards, such as HL7's (CDA) Clinical Document Architecture and CCD (Continuity of Care Document). Also, it leverages a developing Integration Profile: EHR-Cross-Enterprise Clinical Document Sharing (XDS) which allows cross communication for CCD and CDA. This will make for a back end framework to allow sharing between disparate systems. There will still be much work in making sure the data matches up properly.

TeleRay has developed an interoperability engine that is able to communicate with all HCO systems whether they are DICOM or HL7 and package the information into a seamless patient profile containing wither clinical patient data from HL7 systems including labs, scheduling, pharma, ADT (Admissions, Discharge & Transfers) etc. or full fidelity DICOM radiological images- or both in a single patient profile. The DICOM images are cleaned of OEM burrs, proprietary tags, improper FSR (File Set Readers), pixel data value sets, or any obstacle to restoring images on a DICOM compliant node. Many OEMs don't adhere to IHE let alone DICOM Part 10 standards for exchange of images. This is unacceptable in today's environment in which patients are rescanned at an alarming rate adding to cost and inefficiencies. This experience has been eliminated by TeleRay software to ensure that images are delivered with patient data in a format that is universal and acceptable.

TeleRay would be pleased to host a demonstration of our software and begin solving interoperability issues with the exchange of patient images and data. TeleRay is a proud supporting member of IHE.