

RSNA RIC ANNUAL REPORT 2012

RSNA's Radiology Informatics Committee (RIC) has the mission to advance the use of informatics principles in medical imaging to improve quality, safety and efficiency and achieve a patient-centered, evidence-based model of care. In 2012, the RIC achieved several notable milestones and significant progress in its work, which are summarized below.

RSNA Image Share

RSNA has been the prime contractor for a pilot project, funded by the National Institute of Biomedical Imaging and Bioengineering (NIBIB), to create a network for patient-controlled sharing of imaging studies and reports. The Image Share network began enrolling patients in 2011 at an initial group of five sites (http://www.rsna.org/Image_Share.aspx).

This year RSNA began an ambitious program to expand the number of sites and patients using the network. In September RSNA was awarded an additional two-year \$5.3 million contract from the National Institute of Biomedical Imaging and Engineering (NIBIB) to extend the number of patients, participating sites and to move image share from a demonstration project to a nationally adopted set of standards. The contract includes two additional option years, with an additional \$5.5 million to leverage the network for a variety of patient care, quality assurance and research opportunities that such an extended network might facilitate. As with the initial pilot project, Dr. David S. Mendelson of Mount Sinai Medical School is the principal investigator on the new contract.

The initial participating sites in the project— Mayo Clinic, Mt. Sinai Medical Center, University of California – San Francisco, University of Chicago Hospitals, and University of Maryland Health Systems collaborated in the development of an open-source software program called the Edge Server. An Edge Server is installed at each participating site to gather selected images and reports from departmental radiology systems and send them to a secure image repository. The repository, called the Image Clearinghouse, is provided by a vendor, lifeIMAGE, under a subcontract with RSNA. The new contract provides for expanding the network to many additional sites nationwide.

Patients are given secure ID and password information they use to retrieve their images and reports into free accounts with one of the personal health record (PHR) providers (Dell and lifeIMAGE), participating in the network. Patients can use their accounts to store images and share them with care providers as they wish. A help desk has been established for ongoing patient support.

The technical documentation and open source software produced by the project will be made available to industry and care sites. Subsequent phases of the project will enable direct site-to-site transfer of images and reports and support for research and clinical trials.

The architecture of Image Share is based on implementation guides published by the Integrating the Healthcare Enterprise (IHE) initiative. These documents, called IHE profiles, describe the use of standards to achieve interoperability of health information technology (HIT) systems. Image Share adapts the IHE Cross-enterprise Document Sharing (XDS) profile, which is used in health information exchanges in the US and worldwide, for use with medical imaging and PHR systems.

Integrating the Healthcare Enterprise (IHE)

IHE (<http://www.rsna.org/ihe.aspx>) has continued to expand and to advance its mission to promote the standards-based interoperability of health IT systems. IHE includes an umbrella organization, IHE International, and national deployment committees around the globe. IHE International publishes IHE's technical documents. It now includes 13 active clinical and operational domains and more than 500 member organizations worldwide. Dr. David S. Mendelson serves as co-chair of the IHE International Board and chair of the RIC IHE.

IHE USA oversees the annual IHE North America Connectathon, the largest interoperability testing event in health IT. Registration grew to more than 180 systems for the 2012 event. Planning for the 2013 event, which takes place January 28 – February 2, 2013 at the Hyatt Regency Chicago includes testing of new capabilities required to meet Meaningful Use certification criteria.

In the IHE Radiology domain, significant new work included publishing profiles that define post-acquisition workflow (for example to support computer-aided detection and advanced image processing) and for simple, point-to-point transmission of images in a multi-site network. IHE Radiology also advanced work on a profile to support the efficient creation and sharing of structured diagnostic reports.

Reporting

The Reporting initiative of the RIC (http://www.rsna.org/Reporting_Initiative.aspx) has built an expanding library of structured radiology report templates based on structured documents, using RadLex[®] and other standard terminologies, which will enable more efficient reporting systems and generate more uniform and higher value reports. The Reporting Subcommittee, which is chaired by Dr. Curt Langlotz, with Dr. Chuck Kahn serving as vice chair, has published over 200 templates in text and XML format which can be searched and downloaded from the library (www.radreport.org). Each template enables creation of best practice reports for a specific radiology procedure.

The subcommittee is working with industry and the standards community, through DICOM and IHE, to facilitate adoption of structured templates in commercial systems and clinical practice. DICOM Working Group 8 – Structured Reports is developing a generic schema for radiology reporting templates and the transformation of template-based reports into the HL7 Clinical Document Architecture (CDA). The committee continues to work on the proposal submitted to the IHE Radiology Technical Committee to develop an IHE profile standardizing methods for using input templates for structured reporting.

RadLex

The RadLex subcommittee, chaired by Dr. Daniel Rubin, continues to expand and refine the RadLex radiology lexicon (<http://www.rsna.org/RadLex.aspx>) and encourage its adoption and use. RadLex provides radiologists with a free knowledge resource to improve the clarity of their communications, enable improved access to educational materials and help researchers in analyzing radiological data. The development of RadLex is partly supported by contracts with NIBIB.

The past year saw a dramatic expansion of a key component of RadLex, the set of radiology procedure names called the RadLex Playbook. The Playbook now includes procedure names for CT, MRI and X-ray, with ultrasound and nuclear medicine under development. Key pilot projects make use of the Playbook to normalize procedure names for data submitted to the ACR's Dose Index Registry and to provide uniform names for radiology procedures in the "chargemasters" at Department of Defense healthcare facilities. RadLex is also currently being used by RSNA's MIRC, myRSNA and Reporting projects, as well as numerous other services and applications.

RadLex development also includes projects focusing on neuroanatomy and mammography. RadLex now encompasses more than 54,000 items. The RadLex Breast Imaging Subcommittee initiated a project this year using natural language processing to extract and analyze terms from mammography reports.

Recognizing that RadLex terminology now represents a powerful and comprehensive radiology lexicon, there are ambitious plans to use this terminology to index RSNA educational assets. RadLex can be used to create personal connections between RSNA's vast educational resources and individual members based upon personal interests, search histories (through myRSNA), educational choices at the annual meeting and CME requirements. All prior and future content from *RadioGraphics* is now indexed using RadLex terminology (and soon *Radiology* will be, too). Intelligent new applications will enhance every member's experience at the annual meeting and improve the peer review process for our publications.

Dr. Rubin, the RadLex Committee and RSNA have also worked to expand relationships with industry, standards organizations, other medical societies and government agencies to promote the adoption of RadLex. Work has also begun to harmonize RadLex with other clinical terminologies such as CPT, LOINC and SNOMED. Through these harmonization efforts, RadLex has gained recognition and acceptance with larger medical and scientific organizations.

MIRC

The RSNA Medical Imaging Resource Center (MIRC - <http://www.rsna.org/MIRC.aspx>) provides free software tools to meet the research and educational needs of radiologists. The two most well known and widely used tools are the Teaching File System (TFS) and Clinical Trials Processor (CTP). MIRC offers the MIRC Teaching File System (TFS) for creation, sharing and management of teaching files. Under the leadership of the MIRC subcommittee chair Dr. Krishna Juluru, a substantial redesign of TFS was unveiled at

RSNA 2012, featuring a more intuitive user interface and a streamlined workflow that makes authoring cases more convenient than ever. There is a simplified single click installation process. A new user to the teaching file system only needs to point their PACS system to a TFS site in order to begin collecting images for teaching file authoring. Improved capabilities to create and deliver individual or shared case conferences is built in using a simple “shopping cart” model for conference building. TFS also has new user management and usage tracking functions to improve site administration.

The Clinical Trials Processor (CTP) is used for secure sharing of datasets for imaging clinical trials using the Internet. CTP, continues to be used in a growing number of multi-site clinical trials worldwide, including many projects of the National Cancer Institute such as The Cancer Imaging Archive (TCIA). New CTP features this year include enhanced anonymization and management tools. Portions of the CTP technology are incorporated into the RSNA’s image sharing edge server to support secure transmission of image data to the clearinghouse.

Informatics Education at RSNA 2012

RSNA continues to provide a full spectrum of informatics education, with courses evolving to meet the needs of practicing radiologists, researchers and educators. RIC members Drs. Marc Kohli, and William Boonn and Dr. John Eng, the RIC’s liaison to the RSNA Refresher Course Committee, helped organize a set of 32 informatics refresher courses, split between traditional didactic and hands-on computer workshop formats. Topics included advanced visualization and analysis, DICOM data manipulation, Internet resources for radiologists, dose monitoring and quality assurance.

Thirty other informatics topics were presented in additional courses—a total of 44 sessions throughout the week. Topics included: rapid application development, open source applications for imaging, Internet resources, literature searches (presented by the National Library of Medicine), 3D interactive visualization, cloud solutions for radiology, radiation exposure monitoring and natural language processing of radiology reports. RSNA-sponsored projects were represented in these sessions as well, including an overview of RSNA Informatics Projects, IHE, MIRC, the Radiology Reporting initiative, RadLex, and the personalized myRSNA Website and the Quantitative Imaging Biomarkers Alliance (QIBA). The meeting also included sessions addressing the impact on radiologists of “meaningful use” incentives from the Department of Health and Human Services (HHS) and the Centers for Medicare and Medicaid Services (CMS).

The RIC has also long taken a role in guiding RSNA staff in the deployment of technologies to improve user-friendliness and attendee experience at the annual meeting. In recent years the refinement of online and mobile meeting information resources has been a focus. At the 2011 meeting, a new interactive format for refresher course sessions was introduced as a pilot project. Diagnosis Live let attendees compete in teams in an exciting and fun computer-based game show format, making diagnostic decisions based on information presented in the session and seeing their results in real time.

Image Sharing Demonstration at RSNA 2012

The RIC organized a showcase demonstration of technologies developed under its several projects at the RSNA Annual Meeting. The demonstration included:

- Network-based image sharing using IHE profiles and technologies developed for the RSNA Image Share network, including PHRs, site-to-site clinical image sharing and multisite clinical trials
- Dose monitoring using the IHE Radiation Exposure Monitoring profile and DICOM Dose Structured Reports
- Structured radiology reporting using templates from the RadReport.org template library
- RadLex for ordering radiology procedures and including coded values in radiology reports
- MIRC TFS for authoring and sharing teaching files and MIRC CTP for sharing image sets for imaging research trials

Eighteen organizations, including vendors and researchers, took part in the demonstration.

The RIC is always seeking ways to improve radiologic care through informatics and to promote the interests of practicing radiologists to the imaging and health IT industry, government agencies and the broader healthcare community.

This year also marked the conclusion of Dr. Ron Arensons's tenure as board liaison to the RIC. Many of us have had the privilege of working with Ron in his role as RIC chair and subsequently on his return as our board representative. I would like to personally acknowledge Ron's tremendous contributions to the committee and his leadership, mentorship and visionary thinking.

This report would not be complete without also acknowledging the fantastic contributions made by the RSNA staff. I am grateful for their support and endless patience as I transitioned into this role. They continue to make volunteering for RSNA both fun and rewarding.

We welcome the comments and participation of all RSNA members, and others interested in our work. You can forward comments, questions and suggestions to us at informatics@rsna.org.

--Adam Flanders, MD – Chair, RSNA Radiology Informatics Committee