



RADIOLOGY INFORMATICS COMMITTEE (RIC) ANNUAL REPORT 2014

The mission of the RSNA's Radiology Informatics Committee (RIC) is to promote education and research pertaining to critical emerging technologies, digital imaging and healthcare information systems. The RIC fosters cooperation among imaging professionals and industry to drive innovation and oversees a set of informatics projects designed to advance medical imaging to improve the quality, safety and efficiency of patient care. In 2014, the RIC made significant progress on these projects, achieving several important milestones, which are summarized below.

Reporting

The Reporting initiative of the RIC (http://www.rsna.org/Reporting_Initiative.aspx) has created a library of structured radiology report templates (radreport.org), to enable more efficient reporting systems and generate more consistent reports containing higher quality data. The Reporting Subcommittee, which is chaired by Dr. Charles Kahn, has made over 260 templates available online in the template library. These templates have been downloaded or viewed more than 1.5 million times. They represent best practices that can be adapted to local practice patterns.

RSNA has worked with other organizations and the broader radiology community to develop the templates. This year it formed the Template Library Advisory Panel with representatives from the European Society of Radiology to oversee development and review of content for the RadReport library. It also launched the Open section of the RadReport library (<https://open.radreport.org/>) designed to enable the entire radiology community to contribute their own templates for best practices in radiology. Users can upload templates they develop and download and review templates developed by others.

The Reporting committee is also working with industry and the standards community (including DICOM, HL7 and IHE) to facilitate adoption of structured templates in commercial systems and clinical practice. This year Dr. Kahn oversaw reformatting of over 200 templates to make them compliant with the IHE Management of Radiology Report Templates (MRRT) profile, which defines a standards-based method to exchange and use structured reporting templates. As co-chair of DICOM Working Group 8 – Structured Reporting, Dr. Kahn contributed to the publication of DICOM Supplement 155, a schema for radiology reporting templates and the transformation of template-based reports into the HL7 Clinical Document Architecture (CDA) format. The combined use of these standards will enable radiologists to efficiently generate consistent high-quality reports and communicate them to other care providers and patients.

RadLex

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

The RadLex Playbook provides standardized names for radiology procedures in CT, Ultrasound, MRI, radiography, fluoroscopy, and nuclear medicine procedures. A revised release of the Playbook was made this year that includes all major modalities and interventional radiology procedures. It applies a standard naming lexicon to a collation of procedure names used at several leading research institutions

The RadLex Committee has expanded relationships with industry, standards organizations, other medical societies and government agencies to refine RadLex and promote its adoption. RSNA is working with the Regenstrief Institute, under a contract from NIBIB, to harmonize RadLex with LOINC clinical terminologies. This project will deliver a single unified terminology for naming radiology procedures. LOINC applies universal code names and identifiers to medical terminology related to electronic health records and it is a U.S. Federal standard for exchange of clinical health information. The group has developed a model for mapping between Playbook and LOINC names and will complete the integration of Playbook names for CT procedures in the next nine months.

RadLex now encompasses more than 60,000 items. The RadLex terminology is used in numerous RSNA services and applications, including the MIRC Teaching File System and Clinical Trials Processor, educational assets such as *RadioGraphics* and Radiology, *myRSNA* and Reporting templates. This year RSNA has launched a pilot project to use RadLex to tag content in RSNA's journals and meeting program to provide users with recommendations for related content.

RSNA Image Share Network

Since 2009, RSNA has worked with leading research institutions and vendors on a project funded by the National Institute of Biomedical Imaging and Bioengineering (NIBIB) to create a network for patient-controlled sharing of medical images and reports. The goal of the project is to establish a nationally adopted set of standards for patient-controlled sharing of imaging information. Dr. David S. Mendelson of Mount Sinai Medical School is the principal investigator for the project.

The Image Share Network (http://www.rsna.org/Image_Share.aspx) began enrolling patients at five major research sites in 2011. Three large community radiology sites have since been added and 13 additional sites are in the process of joining the network. Patients at participating sites are given secure ID and password information they use to retrieve their images and reports into free accounts with personal health record (PHR) account providers (Dell, DICOM Grid, itMD 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. As of November 2014 more than 16,000 patients had enrolled in the network

Open source software and technical documentation produced by the project are made freely available to software developers and other interested groups. The architecture of Image Share is based on standards 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.

Integrating the Healthcare Enterprise (IHE)

IHE International (www.ihe.net) is a non-profit organization that grew out of an initiative launched by RSNA in 1997. Its mission is to enable seamless and secure access to health information. It publishes and maintains implementation guides called IHE profiles and technical frameworks that detail the use of standards to achieve interoperability in health IT. It now includes twelve active clinical and operational domains and more than 700 member organizations worldwide. Dr. David S. Mendelson serves as co-chair of the IHE International Board and chair of the RIC IHE.

The IHE Radiology Committee develop new standards specifications this year to address image object change management in a teleradiology environment; digital breast tomosynthesis and access to imaging data on mobile devices.

IHE USA, another non-profit organization launched by the initiative, oversees the annual IHE North America Connectathon, the largest interoperability testing event in health IT. Participation at the 2014 event, January 27-31 in Chicago, included 95 vendors and over 130 systems. Plans were also finalized for the 2015 event, which will take place January 26-30 at the Global Center for Health Innovation in Cleveland, OH. The Connectathon allows vendors to test their compliance with IHE profiles and ability to exchange information effectively with their industry peers.

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).

Teaching File System (TFS)

TFS is used to create, share and manage teaching files. With minimal effort, radiology sites can set up TFS as a departmental teaching file. It can run securely inside a firewall and receive images submitted by users directly from PACS. Submitted cases reside in a draft queue, accessible only to logged in users, until the author publishes them. MIRC de-identifies images and allows the author to conveniently add as much detail to the case as desired. It provides detailed access control and enables grouping cases to use in conferences. As of early 2014, there were approximately sixty public TFS sites with over 60,000 cases hosted using MIRC software worldwide.

Under the leadership of chair Dr. Krishna Juluru, the MIRC subcommittee of the RIC began planning potential future developments of the TFS platform including a learning community based on user-contributed content that would be vetted by expert reviewers and delivered to each user based on their past usage and personal profile.

Clinical Trials Processor (CTP)

CTP provides secure Internet communication of datasets for a growing number of multi-site clinical trials worldwide, including projects of the National Cancer Institute such as the Cancer Imaging Archive (TCIA). CTP includes powerful and flexible tools for removing protected health information (PHI) and managing secure transmission of imaging data. A new “wizard” interface was implemented to simplify configuration of the tool to support the most common use cases for anonymization and transport of imaging data. CTP also supports protection of proprietary tags that may contain important parameters needed for quantitative analysis (e.g. DTI, perfusion) and a powerful method for masking PHI in secondary capture objects.

Quantitative Imaging and Biomarker Alliance (QIBA)

RIC collaborates with other RSNA committees on several QIBA-related projects. Kathy Andriole, PhD, leads an ad hoc review committee that has worked with RSNA staff to successfully incorporate the Quantitative Imaging Reading Room (QIRR) exhibit area at the annual meeting into the meeting program and meeting abstract submission system. This area showcases novel pre-commercial software and analytical tools some of which is derived from partnerships between industry and academia.

Working with QIBA volunteer leadership, contractors and RSNA staff, Dr. Andriole has also spearheaded implementation of the Quantitative Imaging Data Warehouse (QIDW) to support QIBA-related projects. A prototype implementation of QIDW was brought on-line in 2013 for use by QIBA members. Over 45,000 images have been uploaded to support 118 registered users and seven active communities who are using this reference data to test and validate algorithms. QIBA is currently evaluating the prototype and making recommendations for new feature requests. The system includes security controls, role-based privileges and user group creation, simple data upload/download capabilities, de-identification using MIRC CTP and basic search, indexing and discovery. A QIDW oversight committee has been formed consisting of members from RIC and QIBA to develop policies regarding data curation security, management and support.

RSNA Informatics and ACR's Imaging 3.0 Initiative

RSNA and the American College of Radiology are coordinating their information technology activities to support a new ACR initiative known as Imaging 3.0™. Tighter coordination of our respective informatics projects could ultimately lead towards improved delivery of imaging informatics solutions for the profession at large. The RIC and the ACR's Information Technology and Informatics Committee (ITIC) had its first joint summit in February 2014 to identify key areas where the two organizations could benefit from collaborative informatics initiatives. Four collaborative workgroups were devised that blend parallel initiatives from the RSNA and ACR:

- Image Sharing
- Radiology Education
- Reporting and Terminologies

- Resources for Radiology Research

These groups, with balanced representation from both organizations, met regularly throughout the year to share information about ongoing initiatives of both organizations and brainstorm new concepts in the field that would benefit from their collaboration.

Clinical Informatics Board Certification

The ACGME recently approved a clinical informatics (CI) board certification process and fellowship pathway to formalize training of future informatics health-care leaders. This very important development is a critical step towards validating informatics as an adjunct clinical specialty. This year the RIC led a successful multi-society ACGME lobbying effort which included the RSNA, ACR, SIIM, ABR, Radiology RRC and the ARRS for inclusion of Radiology as a sponsor for the newly created CI fellowship program. There is now RSNA representation in the development of CI fellowship milestones and content for the ACGME. Members of the RIC have also continued to work with the American Medical Informatics Association (AMIA), the organizing body for the practice board exam and fellowship, to help create imaging informatics content for the CI practice examination and will continue to work towards promoting inclusion of imaging informatics content into the fellowship curriculum and testing materials.

Informatics Education at RSNA 2014

- RSNA continues to provide an array of informatics education, with courses evolving to meet the needs of practicing radiologists, researchers and educators. RIC members Drs. Marc Kohli, William Boonn, and William Weadock, the RIC's liaison to the RSNA Refresher Course Committee, helped organize over 40 informatics refresher courses, split between traditional didactic and hands-on computer workshop formats. In 2014, the chairs assigned topic leaders for the informatics courses to avoid duplication of course content. The topics and their leaders were IHE: David Mendelson and Brad Erickson; Health Policy / Meaningful Use: Curt Langlotz; Quality: Ramin Khorasani; and Reporting: Chuck Kahn. Some interesting 2014 course topics include federal health IT policy panel discussions, ergonomics, tapping into Big Data, hands-on 3D printing courses, open source applications for imaging, Internet resources, literature searches (presented by the National Library of Medicine), cloud solutions for radiology, radiation exposure monitoring, and education tools.
- RSNA-sponsored projects were represented in these sessions as well, including overviews of the RSNA Informatics Projects, IHE, MIRC, the Radiology Reporting initiative, RadLex, and the Quantitative Imaging Biomarkers Alliance (QIBA).
- The RIC once again organized the IHE/RSNA Image Sharing Demonstration at RSNA 2014, a showcase demonstration of informatics technologies and standards developed under its several projects at the RSNA Annual Meeting. The demonstration included:
 - Exchanging images and reports between care sites and sharing them with patients using personal health records (PHR).
 - Using speech recognition to create structured radiology reports with templates from the RadReport template library
 - Radiologist authoring of reporting templates

- Radiologist decision support tools for follow-up of incidental findings and other clinical guidance

Twelve different organizations, took part in the demonstration, which featured both a formal centralized demonstration and demonstrations at the exhibit booths of many of the participating organizations.

In summary, the enthusiasm and innovations by the members of the RIC committee and the tireless efforts of the RSNA staff for the promotion of imaging informatics is nothing short of extraordinary. We are looking forward to a very productive and exciting 2015!

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.

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