



## **RADIOLOGY INFORMATICS COMMITTEE (RIC) ANNUAL REPORT 2015**

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 2015, 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](http://www.rsna.org/Reporting_Initiative.aspx)) has created a library of structured radiology report templates ([radreport.org](http://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 250 templates available online in the template library. These templates have been downloaded or viewed more than 2.5 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 the Template Library Advisory Panel composed of representatives from the RSNA and the European Society of Radiology met to begin its work of translating, developing and reviewing content for the RadReport library. Access to the Open section of the RadReport library (<https://open.radreport.org/>) was also made available for ESR members to access using their ESR login credentials. The Open library is designed to enable the radiology community to contribute templates and download and review templates contributed 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. All 257 templates in the Select template library are now compliant with the IHE Management of Radiology Report Templates (MRRT) profile, which defines a standards-based method to exchange and use structured reporting templates. DICOM Working Group 8 – Structured Reporting, co-chaired by Dr. Kahn, completed balloting 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 Supplement is now incorporated in Part 20 of the DICOM Standard. 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. Ken Wang, continues to expand and refine the RadLex radiology lexicon (<http://www.rsna.org/RadLex.aspx>), and to promote its adoption and use. Using RadLex improves the clarity of radiologists' communications, provides better access to information for decision support and helps researchers analyze radiological data. The development of RadLex is partly supported by contracts with NIBIB.

The RadLex Playbook provides standardized names for radiology procedures in all the major modalities. A new release of the Playbook was made this year that provides a core set of terms optimized for clinical applications. The Core Playbook is available for download and implementation in radiology information systems.

The RadLex Committee has continued to expand 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 joint team completed the integration of Playbook names for CT procedures.

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 RadReport Reporting templates. RSNA uses RadLex to provide users with recommendations for related content in its journals and online meeting program.

## **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](http://www.rsna.org/Image_Share.aspx)) is currently enrolling patients at eight sites, with a number of additional sites 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 (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 2015 more than 21,000 patients had enrolled in the network. RSNA is working with a number of industry partners to expand the network to include their customers for imaging management systems.

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.

At the 2015 Annual Meeting, RSNA announced a new program for validation of the image sharing capabilities of radiology systems. The Image Share Validation Program will be based on IHE standards for image sharing used in the Image Share Network. RSNA has partnered with two experienced testing organizations, the Sequoia Project and the Mallinckrodt Institute of Radiology at Washington University in St. Louis to administer the program and conduct the testing. A pilot testing program will begin in January 2016.

### **Integrating the Healthcare Enterprise (IHE)**

IHE International ([www.ihe.net](http://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 that detail the use of standards to achieve interoperability in health IT. It now includes twelve active clinical and operational domains and more than 150 member organizations worldwide. Dr. Mendelson serves as co-chair of the IHE International Board and chair of the RIC IHE.

The IHE Radiology Committee developed new specifications this year to address guideline appropriate ordering and clinical decision support, management of images captured with 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 2015 event, January 26-30 in Cleveland, included 98 vendors and 148 systems. The event was the first to be held 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 and the RSNA Learning Community**

For more than 15 years, the RSNA has been providing free software tools to meet the research and educational needs of radiologists Medical Imaging Resource Center (MIRC - <http://www.rsna.org/MIRC.aspx>). This year the RIC helped develop a proposal that was approved by the RSNA to build the RSNA Learning Community, which will be an online resource for peer-reviewed educational materials for decision support and continuing education. Look for more to come in 2016 on this exciting new project.

Meanwhile, RSNA continues to support the tools provided by MIRC, including the Teaching File System (TFS) and Clinical Trials Processor (CTP).

#### *Teaching File System (TFS)*

TFS is used by radiology sites to create, share and manage their departmental teaching files. Sites can run TFS securely inside their firewalls and enable users to send images directly from PACS. TFS de-

identifies images, keeps them in the author's secure queue until published and allows the author to add as much detail to the case as desired. Approximately sixty public TFS sites with over 60,000 cases hosted using MIRC software worldwide. Sites can expose subsets of cases to the public Internet where they can be queried by other TFS sites.

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 image datasets for multi-site clinical trials worldwide, including projects of the National Cancer Institute such as the Cancer Imaging Archive (TCIA). CTP includes tools for removing protected health information (PHI) and managing secure transmission of imaging data. The latest release of CTP offers improved auditing of information about imaging data sent.

### **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 are 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/ACR Joint Effort for Common Data Elements**

RSNA and the American College of Radiology have worked to coordinate their informatics activities to provide the greatest possible benefit to the radiology community. At a joint meeting of the RIC and the ACR Informatics Commission in February, the combined group identified as its highest priority for collaborative work the definition of a set of common data elements (CDEs).. A CDE typically represents a single concept/feature with a set of controlled responses. They are applicable to a variety of applications including radiology reporting, decision support and research. A joint work group was put

in place to scope out the project and has begun identifying the best method for developing and publishing CDEs for radiology.

### **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 2015**

- 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 2015, the chairs assigned topic leaders for the informatics courses to coordinate 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 2015 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, 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 2015. Twelve organizations took part in this 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
  - Decision support tools for guideline-appropriate ordering of radiology procedures and follow-up of actionable findings

Imaging informatics is a rapidly accelerating, moving target guided by innovations in industry and regulations driven through government mandates. I am proud to say that the members of the RIC and RSNA staff have worked tirelessly to remain on top of all of the major changes and have helped to develop both new standards and processes to exploit new technologies for organized radiology and to meet the challenges for the future.

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](mailto:informatics@rsna.org).

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