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RSNA RIC Annual Report 2010

2010 was primarily a year of hard work for the RIC and subcommittees, building upon the multiple initiatives undertaken last year. These will be described in detail below. The three significant new areas are “Meaningful Use of Healthcare IT (HIT)” as defined by the federal government, radiation dose monitoring and reporting, and a serious effort to synchronize and harmonize the separate informatics efforts of RSNA and the ACR, in support of both organizations’ strategic objectives.

We are in the middle of the two year $4.7 million NIH/NIBIB contract to RSNA to demonstrate patient controlled sharing of imaging studies and reports. Patient control will be exercised through Personal Health Records (PHR’s).

The five initial participating sites (Mayo Clinic, Mt. Sinai Medical Center, University of California – San Francisco, University of Chicago Hospitals and University of Maryland Health Systems) have collaborated on development of an “Edge Device” to securely send patient images and reports to a Clearinghouse where they can be retrieved via the patient’s personal health record (PHR) account. A vendor (lifeImage) has been selected to provide the Clearinghouse and another (InSite One) has been selected as the first PHR partner for the project. Testing began on communication between these systems in October, 2010. These capabilities were demonstrated in a hands-on demonstration at the RSNA 2010 Annual Meeting. Meaningful Use (MU) of HIT captured the attention and time of many of the committee members over the past year. This is an important issue for radiologists in both hospital and outpatient based practices. Second funds are available now, and penalties in the future, for demonstrating MU. Initially the guidelines either ignored or were irrelevant to radiology, but hard work by many committee members and our knowledgeable staff were able to make significant progress in that regard.

The Reporting Subcommittee demonstrated incredible productivity, as did RadLex. Significant improvements in MIRC were made available. We expect our latest rendition of Refresher Courses and Workshops, as well as “out of band” courses that will include Meaningful Use, to be well received.

As you can see from the reports below, these activities span patient care, establishment of national HIT standards for secure sharing of patient information, particularly as they relate to imaging, reporting and communication, support for education and research, and education of the radiology community about informatics issues. Our activities appear to have anticipated the elicitation of Meaningful Use for radiology, and I believe

that is an indication of the knowledge, wisdom, and future vision of our committee members.

IHE

Integrating the Healthcare Enterprise (IHE) has continued to grow and to promote the standards-based interoperability of health IT systems. With the oversight of the RIC IHE Subcommittee and its chair, Dr. David Mendelson, IHE contributed significant new work in radiology and expanded its support for the deployment of interoperable IT systems across healthcare domains and settings.

IHE profiles provide the technical foundation for an Image Sharing Network pilot project funded by the National Institute of Biomedical Imaging and Bioengineering (NIBIB) under a contract with the RSNA. The project establishes an infrastructure, based on the IHE Cross-enterprise Document Sharing for Imaging (XDS-I) profile, for providing patients with control over their medical images and reports via personal health record (PHR) systems. It also appears that this IT infrastructure can be used for radiology dose aggregation and reporting. The network will be launched at five initial sites in early 2011 and at several additional sites in the succeeding months.

The first public demonstration of this image sharing infrastructure took place at the RSNA 2010 Annual Meeting. The demonstration showcased the technologies developed under the project, including an Edge Device to manage sending of images and reports securely from local radiology systems, an image Clearinghouse to temporarily store the images and make them available for secure retrieval and PHR systems to retrieve and permanently store the images and reports, enabling patients to maintain these records and share them at their discretion.

The demonstration also featured modalities that generate dose information in structured formats defined by the DICOM standards and dose monitoring and management systems that received and displayed that information, all using transactions defined in the IHE Radiation Exposure Monitoring (REM) profile. The systems showed how dose can be tracked in an effective local dose monitoring program. They also anonymized the dose reports and submitted them to a demonstration implementation of the American College of Radiology's National Radiology Data Registry (NRDR).

The IHE Radiology domain published the Chest X-Ray CAD Display profile, which defines how DICOM standards are applied to the display of computer-aided diagnosis (CAD) objects. The profile stands to broaden the adoption of CAD in radiology. Also newly published is the Multiple Image Manager/Archive (MIMA) profile, which describes the behavior of systems linked to a shared image archive, as in several national electronic health record programs.

IHE International, the umbrella organization of IHE, which was incorporated in 2009, has continued to expand and now boasts more than 370 member organizations worldwide. Dr. Mendelson is a co-chair of the IHE International Board. IHE USA, an organization formed to oversee testing and deployment activities domestically,

incorporated earlier this year. Dr. Mendelson and I, as well as Steve Drew, RSNA's Assistant Executive Director for the Scientific Assembly and Informatics, serve on the IHE USA Board.

The IHE North American Connectathon, IHE USA's major annual activity, saw record participation in 2010, with more than 100 organizations testing over 150 systems. The Connectathon is the health IT's largest face-to-face testing event and provides invaluable interoperability testing for systems developers, including vendors preparing their systems for certification testing to meet "meaningful use" requirements.

MIRC

The RSNA Medical Imaging Resource Center (MIRC) is overseen by an RIC subcommittee chaired by Dr. Adam Flanders. MIRC consists of two distinct programs addressing different use cases: the Teaching File Software Suite (TFSS) for creation and management of teaching files and the Clinical Trials Processor (CTP) for secure sharing of datasets for imaging clinical trials. The programs were split apart some time ago so that each could be optimized for its particular use case. This year the programs were recombined to allow the TFSS to take advantage of the advanced infrastructure for image management built into CTP.

The teaching file software has also been enhanced with more robust indexing for large sites and improvements in the user interface including more convenient resizing of images. The method for importing images from PACS, using the IHE Teaching File and Clinical Trial Export (TCE) profile has also been made more convenient in the latest release. That release also features "single-click" installation, removing a significant obstacle to deploying the TFSS.

CTP continues to be used in numerous multi-site clinical trials and John Perry, the lead developer of the software, has continually adapted it to meet the needs of researchers at the National Cancer Institute and other users.

An exciting MIRC pilot project came to fruition in the June/July issue of *RadioGraphics*. Working with TeraRecon and using MIRC to help manage the display of image arrays, RSNA enabled readers to view supplemental case material (e.g. additional images, pathology or documentation) and entire image datasets including 3D models, which more closely replicates the clinical reading environment.

Reporting

The Reporting Subcommittee is chaired by Dr. Curt Langlotz, with Dr. Chuck Kahn serving as vice chair. Its primary goal is to create a library of structured radiology report templates based on RadLex® and other standard terminologies that will enable more efficient reporting systems and generate more uniform and higher value reports. This year, the committee continued to refine and expand upon the initial set of over 70 report templates it published in 2009 (http://reportingwiki.rsna.org).

Vendors began implementing these templates in reporting systems soon after they were released. Based on the initial round of template creation, the committee began work on a master template to guide future developers and published a style guide for templates. It also began design of a more feature-rich template library to facilitate publication and access to the templates. RSNA and a consortium of researchers, led by Drs. Kahn, Langlotz and Rubin, were awarded a contract from the National Institute of Biomedical Imaging and Bioengineering (NIBIB) to support this work as a supplement to NIBIB's ongoing support of RadLex development.

The committee also continued working with industry and the standards community, through DICOM and IHE, to facilitate adoption of structured templates in commercial systems and clinical practice. RSNA assumed the secretariat of DICOM Working Group 8 – Structured Reports and restarted the work of that committee. The committee also submitted a proposal to the IHE Radiology Technical Committee to develop an IHE profile standardizing methods for structured reporting.

RadLex

The RadLex radiology lexicon, overseen by a subcommittee chaired by Dr. Daniel Rubin, continues to grow, both in the breadth of its coverage and in the range of applications putting it to use. RadLex will provide practicing radiologists with a knowledge resource that will improve the clarity of their communications, enable improved access to educational materials, and help researchers in analyzing radiological data. In five years of development, RadLex has grown to more than 35,000 instances, including primary terms, synonyms, or foreign equivalents. RadLex is currently being used by RSNA's MIRC, myRSNA and Reporting subcommittee projects, as well as numerous outside services and applications.

RadLex continued to expand in 2010, with especially robust development in neural connectivity and lymph node anatomy. The Breast Imaging Subcommittee began developing terms specific to mammography, MRI and ultrasound and compiling ACR BI-RADS descriptors to include in RadLex. Thousands of synonym terms were added based on user queries in Yottalook, a radiology-specific search engine. And RadLex was given a richer ontological structure, bringing it into alignment with the Functional Model of Anatomy.

The committee also produced the first release of a new component of RadLex called the Playbook that provides names for CT orderables and procedures. The ACR became an early adopter of the Playbook, using it to harmonize procedure information submitted to its pilot Dose Registry project.

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 and its harmonization with other medical terminologies.

Informatics Education 2010

RSNA continues to provide a full spectrum of informatics education, with courses evolving to meet the needs of practicing radiologists, researchers and educators.

Dr. John Eng, the RIC's liaison to the RSNA Refresher Course Committee, has helped organize a series of informatics refresher courses consisting of four tracks for a total of 32 courses. Two of the tracks (26 and 30) utilize a traditional didactic format, and the other two tracks (53 and 54) are held in a workshop setting.

Track 26, "Radiology informatics in clinical practice," contains courses related to topics that arise in the daily practice of radiology and is co-organized with the Society of Imaging Informatics in Medicine (SIIM). Eight courses were offered in 2010, including the following four new courses:

- Decision Support in Clinical Practice – Kahn, Burnside, Napel (revised)
- Data Mining, Searching, and Analytics of Radiology Reports – Kim, Dreyer, Taira
- Cool Technologies for Radiologists – Thapa, Richardson, Petscavage

Courses related to research or education are included in Track 30, "Imaging informatics for clinical, research, and educational enterprises," along with some clinical topics concerning the overall specialty.

- Imaging for Clinical Trials and Research Networks – Jaffe, Juluru, Siegel
- Applications of standard Terminology – Rubin, Channin, Heilbrun (revised)
- Image Exchange and Distribution – Igras, Menschik, Erickson

Courses for both Hands-on Workshop tracks (53 and 54) are held in computer laboratories with one to three attendees seated in front of each of 24 computer workstations. This format allows attendees to follow along with interactive exercises presented by the instructor. Roaming proctors are provided to help individual attendees with any problems that arise in this interactive format. Since class sizes are relatively small, each course is offered twice during the week.

Track 53 is an introduction to applications for 3D visualization. A new feature of this track is the utilization of multiple software vendors providing thin-client platforms. Three of the four courses in this track cover applications for different anatomic regions:, Vascular Imaging and Advanced Stent Planning, Neuroimaging and Multimodality Fusion, and Cardiac Imaging. A new course being offered is Hands-on Public-Domain DICOM Applications to Manage Image Data.

Track 54 offers four hands-on workshop introductions to software or Internet resources helpful to radiologists: creating multimedia web-based educational presentations, introduction to content management systems for creating a website, data collection, organization, and analysis with databases and spreadsheets, and internet resources for decision support and learning while you work..

Finally, 30 unique informatics "out-of-band" courses are being held at RSNA 2010, some of which are repeated for a total of 40 sessions throughout the week. New

courses offered this year are:

- DtiStudio/MriStudio: Integrated Software Resource for White Matter Mapping and Quantitative Image Analysis
- Lifecycle of an Imaging Biomarker: From Validation to Dissemination Using Natural Language Processing on Radiology Reports
- Getting From Solicitation to Publication in RadioGraphics - Upping the Odds (revised)
- Sharing Images on CD, DVD and USB: Standards, Tools and IHE PDI (revised)
- Sharing Images between sites: Standards, Tools and IHE XDS-I (revised)
- Digital Mammography Workflow: Standards, Tools and IHE MAMMO (revised)
- Monitoring Radiation Exposure: Standards, Tools and IHE REM (revised)
- IHE for IT Administrators: Implementation Considerations, Electronic Measurements and Reports (revised)

This year we added three special imaging informatics sessions to address the impact of the new "meaningful use" incentives from the Department of Health and Human Services (HHS) and the Centers for Medicare and Medicaid Services (CMS):

- Healthcare Reform through Meaningful Use of Healthcare IT: Implications for Radiologists – Avrin, Dreyer, Khorasani, Mendelson
- Adding Millions of Dollars to your Practice through Meaningful Use - Avrin, Dreyer
- Meaningful Use for Radiology IT Vendors: What your Customers will Demand and your Competition will Provide – Avrin, Dreyer

Conclusion

As we look to the future, the RIC has two primary strategic concerns: "telling" the RSNA informatics story to our membership and the wider community; and continuing to participate meaningfully and with appropriate recognition in national HIT activities.

Most of our activities acquired a heightened sense of importance with the evolution of the Meaningful Use rules of the federal government. As mentioned above, our initiatives appear to have anticipated in broad concept many of the underlying themes. There was a lot of effective lobbying activity to bring MU into line with the realities of radiology practice, and we are excited about the potential positive aspects for our profession.

Great progress was made with the ACR and other selected organizations to "harmonize" and coordinate our efforts and to present a united front for radiology before the Office of the National Coordinator for Health IT and other federal agencies set up to deploy the electronic health record. We will have a joint meeting of the RSNA and ACR informatics committees and staff at our Annual Meeting, and have developed an agenda to pursue with the support of the leadership of both.

New blood for the committee remains a challenge because of the domain knowledge and experience of the senior members. In spite of this we have been successful at

engaging some of the brightest young radiology informatics talent in our subcommittee efforts, for eventual promotion.

Ron Arenson's guidance for our committee agenda and his personal mentorship are special. He hasn't lost one bit of his enthusiasm for the potential of information technology to transform our profession.

Finally, I must repeat and emphasize what I said last year, that most important, without the support of the savvy and stable RSNA staff: Nichole Drye-Mayo, Mary Minster, Chris Carr, Joan McMillen, and Steve Drew, NONE of this would be possible. It remains an honor and a privilege to work with them.

--David Avrin, MD – Chair, RSNA Radiology Informatics Committee