



Demonstration Overview

IHE Image-Sharing Demonstration at RSNA 2006

In its continuing effort to promote adoption of standards-based, image-enabled electronic health record (EHR) through the IHE initiative, RSNA will sponsor a demonstration featuring the Cross-enterprise Document Sharing for Imaging (XDS-I) and Teaching File and Clinical Trial Export (TCE) integration profiles and related IHE profiles. The demonstration is intended to showcase breakthrough methods for sharing information across departmental and institutional boundaries to enhance clinical care, research and education in medical imaging.

Participants

Vendors of healthcare imaging and IT systems, as well as care sites and other organizations that use such systems are invited to participate. To qualify for participation all organizations are required to implement and test XDS-I and/or TCE capabilities in their systems and prepare to perform demonstration clinical scenarios that involve generating, managing, storing, retrieving and displaying typical patient records, including images and reports provided for demonstration purposes.

Testing

The testing process will include preliminary testing with software tools, demonstration scenarios and sample images, reports and other materials supplied by the sponsor and a face-to-face testing event hosted by the sponsor, Oct. 9-11, 2006 at RSNA HQ, Oak Brook, IL. Successful completion of all aspects of testing is a prerequisite for participation in the demonstration.

Demonstration

Participants will perform the demonstration at RSNA 2006 Annual Meeting in two settings: in a centralized demonstration in the Lakeside Learning Center (East Building of McCormick Place) and in a distributed demonstration in participants' exhibit booths in the North and South Halls of McCormick Place. Participants who are exhibitors will have the option of participating in either or both of these settings.

The centralized demonstration will feature a brief video introduction and coordinated, docent-guided demonstration tours following specific clinical scenarios and using images, reports and related materials provided for the demonstration by RSNA. Participants will be required to provide dedicated systems and personnel sufficient to man each system during the course of the RSNA meeting, according to a schedule to be developed and distributed by RSNA. In addition to developing the video introduction,

RSNA will provide signage fixtures, electrical power, network connections and organize docents to guide attendees.

The distributed demonstration will be conducted by dedicated, knowledgeable vendor participant personnel in designated 10' x 10' space within the participant's exhibit, using systems specifically allocated for the demonstration. RSNA will provide signage and graphics to be incorporated into the participant's booth in the designated demonstration space. RSNA will also conduct one or more preparatory Web/teleconferences to inform participant personnel about the details of the demonstration and expectations for their participation. Representatives of the IHE Review Committee will visit the booth of each participant in the distributed demonstration one or more times during the RSNA meeting. Participants who, in the judgment of the Review Committee, satisfactorily perform the distributed demonstration, will receive a space rebate of \$1525, equivalent to 50% of cost of the 10' x 10' space allocated for the demonstration.

Attendee Experience

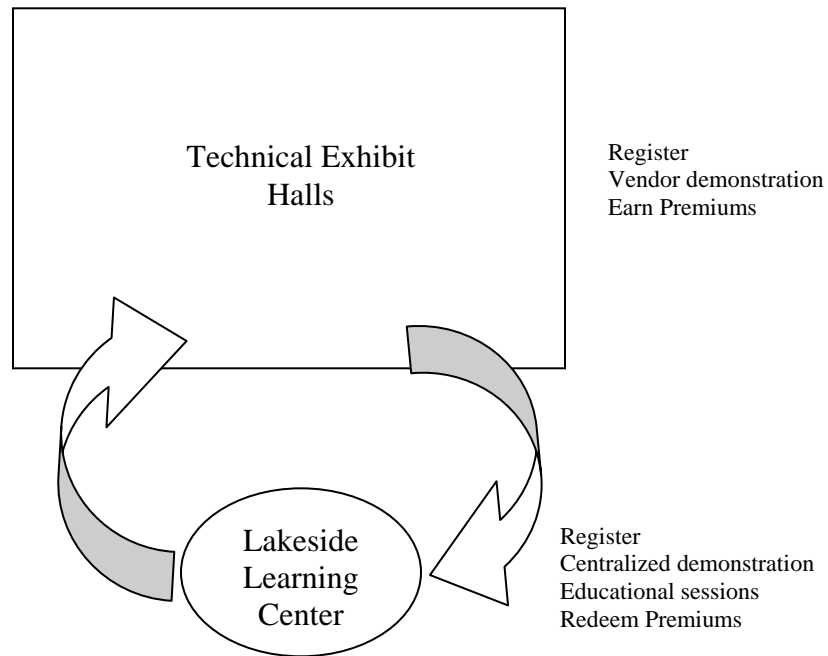
In the demonstration, attendees will follow one of a few different clinical scenarios that emphasize the development of a patient history over several encounters at different simulated care sites, and the ability to access to this full history from other sites in the network. Systems in the centralized and distributed demonstration will share and build upon the same set of patient histories.

Attendees will be encouraged to participate in both the centralized and distributed demonstration. Attendees participating in the centralized demonstration will be given incentives, in the form of a premium and/or entry in a prize drawing, to visit participating vendor booths and see them perform the distributed demonstration. "Passports" will be given to attendees at the centralized demonstration are in Lakeside Learning Center and at kiosks in the North and South Halls of McCormick Place. They will collect stamps at participating vendor booths and return the passport to the Lakeside Learning Center to receive a premium and be entered in a daily drawing.

Demonstration Process

- 1) Attendees will be invited to enroll as patients and receive a Patient ID and initial set of patient records as a medical history. Enrollment points in all three halls of McCormick Place.
- 2) In the demonstration area in Lakeside Learning Center, attendees will view a video introduction and receive a detailed docent-guided walk-through of the demonstration. Following detailed clinical scenarios they will:
 - a. Acquire new images and create new reports for their patient(s)
 - b. Access prior image studies, reports and other patient documents at time of diagnosis
- 3) Participants in the centralized demonstration will also be given incentives to continue participation at vendor booths, such as the opportunity to enter a daily prize drawing.
 - a. At vendor booths participants can do additional demonstration steps such as viewing existing records and adding related studies and reports

- b. At each vendor booth the attendee will receive a token of participation that they can redeem for a premium and entry into a prize drawing.
- 4) A full program of IHE educational sessions will also be offered at RSNA.



IHE Image-Sharing Demonstration Flow

Sample Clinical Scenarios

Scenarios are being developed based on technical functions to be performed and compelling clinical cases. RSNA will gather and provide supporting materials for each of the Scenarios. The presentation will emphasize the general benefits provided to support clinical care.

- 1) Topic: Aortic Transection
 - a. A XXXX year old patient is in an auto accident and barely conscious is brought to the local ER, in a small community hospital, where he complains of severe chest pain. A emergent C+ CT of the Chest, Abdomen and Pelvis reveals injury to the thoracic aorta. The patient is stabilized, but it is apparent that he need emergent repair of his ____aorta, a service not available at this hospital. They have a standing arrangement with a trauma center 50 miles away to airlift such patients. Prompt arrangements are made including notification of the surgical thoracic team that the patient is expected to arrive in one hour. The patient is prepared for transport. It is noted that his hematocrit continues to drop, he is transfused several units of blood and several units of blood are prepared to be available during transport.
 - b. Upon notification the trauma center alerts its thoracic surgical team that the patient is expected to arrive in approximately an hour. The lead surgeon request access to the CT exam performed at the community hospital.

- c. The surgeon meets the radiologist in the radiology department. As part of the transfer protocol the patient has been registered in the hospital ADT system, which also populates the Radiology Information System and PACS. Together, through the PACS, they contact the statewide repository, and find the CT exam performed at the remote site just 30 minutes earlier. This is downloaded into the local PACS systems and reviewed.
- d. The patient arrives by helicopter and is taken directly to the operating room, no further imaging needs to be performed. An aortic repair is performed.
- e. The patient recovers over several weeks, and requires some rehabilitation therapy. Fortunately, he is expected to regain full function. He has 2 follow-up CT exams during this time to assess the status of his aortic repair.
- f. The patient is discharged and returns to his local community. He wishes to be followed by his own internist, who has privileges only at a 3rd hospital; not either of those involved during his initial care.
- g. Follow-up imaging is arranged at the imaging center run by this 3rd institution. They gain access to all the preceding exams, again through the statewide registry, where the IHE- XDS/I protocol provides the basis for image exchange.

Without XDS-I - The initial transfer of the patient is delayed until the images of the patient can be printed or written to disc. It turns out that the accident occurred at 2 AM, and the single radiology technologist does not know how to write an examination to CD, but can arrange to print the exam to film. It takes 45 minutes to print and assemble 30 sheets of film representing the entire CT. The surgeon at the trauma center cannot plan his procedure until he is handed the film upon arrival of the patient. Then, along with the radiologist, they sort through the 30 sheets of film – they only have a single bank of 2 view boxes, since this site went to full digital imaging 3 years earlier. This further slows down their analysis of the exam. The surgical team with the patient in the OR, pages the surgeon, alerting him that the patient is hypotensive, they believe it is urgent to commence a procedure. The lead surgeon has gleaned enough information from the CT to understand the location of the aortic injury and initiate the procedure. The surgery is successful, but the patient has permanent mental status changes, possibly from the period of hypotension, during the film review. He requires extensive rehabilitation, and his family states that though he functions he is clearly debilitated. He is forced to retire and collects a very modest income from social security. As an added inconvenience, when going for follow-up care in his local community, he must bring 5 envelopes, 14 X 17, each containing 30- 50 sheets of film displaying his numerous radiological examinations.

With XDS-I - The patient is transferred immediately after completing his initial CT. He is taken directly to the OR, where the surgical team, already aware of the radiological findings is prepared to operate. At least 90 minutes have been saved. His blood pressure has been maintained the entire time. Though his recovery takes several weeks, he never suffers from any mental

impairment, and eventually returns to his normal employment. When he goes for follow-up visits, he need not bring anything with him.

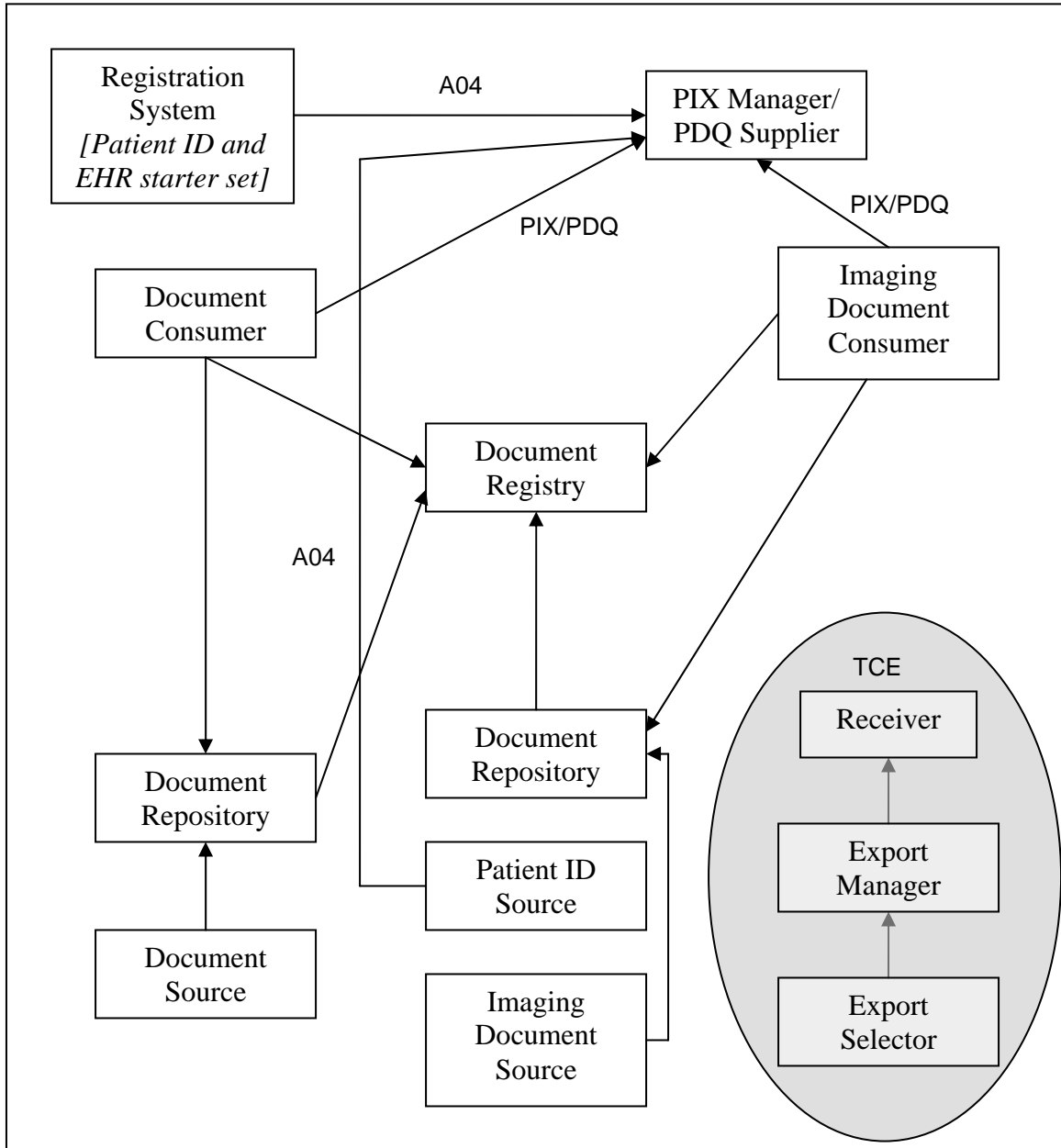
2) Topic: Pulmonary Nodule (Variant on HIMSS scenario 1)

- a. At 10 AM a patient who has just been involved in an auto accident, now complaining of abdominal pain is admitted for observation to the hospital. An incidental lesion is seen on a CXR performed in the ER. The patient is stabilized and admitted two hours later. Once on the nursing unit the patient reports to the admitting surgeon that 2 years earlier while living in another part of the country, he had an abnormal CXR and was told to obtain a follow-up CXR, but he had never done so. The surgeon comes down to the radiology department to review the CXR and informs you of the above history.
- b. You review the CXR with the surgeon and note that there is an incidental finding of a 1 cm. nodule in the RUL. The surgeon informs you of the patient's location 2 years earlier. Over the next 5 minutes you check the "XXXX repository" and confirm that a 2 year old CXR is available at "Old chest medical center". The registered CXR is available for sharing and is immediately obtained. Comparison of both exams reveals that there has been no change and the patient is informed that this is likely a benign lesion, though it is desirable to obtain further follow-up.
- c. The surgeon dictates a discharge summary (XDS) making this information available to the patient's primary care physician, who does not have privileges at this hospital.

Without XDS-I: Clinician must inform patient of an abnormality that is possibly malignant, raising patient concern. Patient must contact a family member to call the site of the prior exam- two time zones away- and start arrangements to obtain a "Copy" of the prior exam. A week after numerous phone calls, and FAXes, the remote site agrees to mail a copy of the original examination. The copy arrives at the patient's home 4 days later. One day later the patient arranges to bring this film directly to you. Unfortunately, it is a poor copy and not satisfactory for comparison. You spend 15 minutes calming the patient down and explaining that this sometimes happens, and together you call the original hospital. They agree to send another copy, but only to the patient. This arrives four days later at which time (15 days since the recent event) you can inform both the patient and the surgeon of the good news that the lesion is stable and likely benign.

With XDS-I: At the time of the initial review with the admitting surgeon the patient provides the history of the prior "abnormal" CXR. The patient is concerned about the new finding. An hour later the surgeon stops in the Radiology department to provide this history. Five minutes later the old exam has been obtained, compared and an addendum added to the initial report. This all happens within four hours from the patient's presentation to the ER. The issue is resolved without 2 weeks of phone calls and patient anxiety.

Technical Overview



IHE Image-Sharing Demonstration Actors/Transactions

Notes

- 1) RSNA will provide a registration system that provides a patient ID for each attendee registrant. Each registrant will have an initial set of patient records associated with his or her patient identity.
- 2) A Patient Identity Cross-reference Manager and a Patient Demographics Supplier will be provided (by RSNA or a demonstration participant) to associate patient

- records across identity domains. It will receive A04 messages from Document Sources and respond to queries by Document Consumers.
- 3) A Document Registry will be provided (by RSNA or a demonstration participant) to maintain listings for all patient records in the network. It will receive messages from Document Repositories and respond to queries from Document Consumers.
 - 4) Demonstration participants may group combinations of the actors shown above from the XDS, XDS-I and TCE profiles shown above. For example, a Document Source might be grouped with a Document Consumer or an Imaging Document Source might be grouped with an Export Selector. They may also group the actors shown above with actors from complementary IHE profiles such as Report Creators, Image Manager/Archives and Image Displays.
 - 5) Demonstration participants who wish to take part in steps where patient record documents and images are generated or acquired, will need to be capable of generating or receiving patient IDs and including them in these patient records, as well as supplying any patient IDs generated to the PIX/PDQ Manager. For example, an Imaging Document Source will need to be linked with an Order Filler/DSS, Image Manager/Archive and an acquisition modality able to simulate acquisition. Demonstration participants are invited to include these systems in their applications.
 - 6) The RSNA will provide a Medical Imaging Resource Center (MIRC) storage site to act as one Receiver actor in the TCE profile demonstration.