

Driving Success by Integration

Many customers have already experienced the benefits and added value of the “Integrating the Healthcare Enterprise” (IHE) initiative. This is a compendium of success stories compiled exclusively for Medical Solutions.

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**THE STAEDTISCHE
KLINIKUM GOERLITZ**
provides diagnostic and
therapeutic service to more
than 43 500 in- and out-
patients as well as 10 000
emergency patients per year.

Applying Information Technology (IT) to improve patient care quality while at the same time reducing the cost of care delivery is a challenge for both vendors and providers alike. The tasks they face include the exchange of patient information across departmental boundaries as well as across multiple systems. Fast access to clinical data at the point of care, ensuring data integrity by eliminating sources of errors, and the optimization of the clinical workflow as well as greater patient throughput are crucial.

Seamless integration of a large number of information systems and devices is vital for solving these tasks. In 1998, the Radiological Society of North America (RSNA) and the Healthcare Information and Management Systems Society (HIMSS) founded the “Integrating the Healthcare Enterprise” (IHE) initiative with the goal to increase the pace

of nonproprietary integration of information systems for typical multivendor settings. Representatives of healthcare providers, users, and vendors have since worked together in defining a comprehensive integration framework – a blueprint for designing interoperable products and systems that exchange information using well-established IT standards such as DICOM and HL7.

A Successful Partnership

Siemens Medical Solutions – cofounder of the IHE initiative – has made significant contributions to promote and advance the IHE integration framework in the clinical practice. The Siemens portfolio includes a steadily increasing number of products and solutions with built-in IHE integration capabilities such as modalities, workstations, Picture Archiving and Communication Systems (PACS), Radiol-

ogy Information Systems (RIS), and Hospital Information Systems (HIS). Over the past years, the RSNA has published various user success stories that clearly show the benefits of IHE combined with the added value of Siemens' proven outcomes. The posted stories include case studies from various institutions such as the McKay-Dee Hospital in Ogden, Utah, the Johannes Gutenberg University Hospital in Mainz, Germany, to name but two. Further success stories of customers and their accomplishments with Siemens products will be published in the IHE theater in the infoRAD area during the RSNA 2004 congress.

The first of these success stories comes out of the Bethesda Healthcare Systems in the United States, whose imaging department needed a major upgrade of its workflow in 2001. The Siemens Medical Solutions' SIENET Integrated Radiology Suite, a fully integrated brokerless RIS/PACS solution, was installed in the emergency department, the ICU and NICU, radiation oncology, the women's health center, and the imaging department. The rest of the hospital and some 300 physicians have access through the PACS web server. This all went live in May 2002.

Measurable Outcomes

IHE integration profiles were instrumental in achieving the desired outcome of workflow. The Scheduled Workflow profile and Patient Information Reconciliation Profile were essential in coupling RIS and PACS and to enable smooth workflow. The DICOM Modality Worklist (MWL) was essential to avoid manual entries of demographics in the imaging modalities. Finally, some but not all of the modalities were capable of DICOM Modality Performed Procedure Step and Storage Commitment Service Object pair (DICOM MPPS/SC). Modalities include Siemens CT, GE Ultrasound (DICOM MPPS/Scand MWL) Toshiba CT, Vitrea workstations (MWL), GE PET/CT (MWL), and Shimadzu fluoroscopy systems (MWL).

Some of the measurable outcomes at Bethesda Healthcare Systems were faster report availability, fewer repeat exams as

well as paperless and filmless workflow. Year one cost savings for the imaging department totaled 1 075 916 dollars, while the cost savings projection for year two ending April 30, 2004, stands at 1 096 599 dollars.

A 'Filmless' Environment

The McKay-Dee Hospital in Ogden, Utah, has been in operation with a fully digital radiology department, excluding mammography, since early 2002. McKay-Dee is part of Intermountain Healthcare Care (IHC) – 22 hospitals, 100 clinics with a combined number of 2 068 beds in the Utah area and Southern Idaho. For radiology, 93 100 examinations were performed in 2001 with an estimated increase of approximately 5 percent annually. The quick success from planning, which started in early 2000, to completion of a "filmless" environment was made possible via the selection of systems from vendors who are not only committed to international standards (DICOM, HL7), but who are also committed to the harmonization and integration between different vendor systems (IHE).

McKay-Dee operates within a mixed environment from several vendors such as Siemens

“DICOM standards as well as IHE are incorporated in syngo, our uniform solution.”

Dr. Manfred Wangler,
Siemens Medical Solutions,
Head of Software Components
and Workstations



SINCE MAY 2002 the Bethesda Healthcare Systems employ a fully integrated RIS/PACS solution from Siemens.



THE JOHANNES GUTENBERG UNIVERSITY HOSPITAL in Mainz, Germany, operates on IHE-based medical and information systems.

“IHE is reality at Siemens Medical Solutions.”

Dr. Nikolaus Wirsz,
Siemens Medical Solutions,
Software Components and
Workstations

Medical Solutions for most of the modalities, Agfa and AMICAS (PACS and web distribution) as well as Mitra for connection to RIS. The IHE profiles with their actors are excellent guidelines for the implementation. The benefits of the fast integration are that the outstanding procedures are performed with the DICOM MWL without having to wait for paperwork and manual data entry of patient demographics. Examinations are performed, checked for quality, and sent to the PACS much faster than preintegration, the high data integrity between RIS, modalities and PACS helps to have consistent data, while the increased volume does not require additional staff.

Moving Away from Paper

The Staedtische Klinikum Goerlitz is a health facility with 16 different departments and approximately 700 beds. Five in-house departments as well as various cooperation partners provide diagnostics and treatment. Every year more than 21 500 inpatients, 22 000 outpatients and about 10 000 emergency patients are examined and treated in the facility.

Until the end of 2003, the information on scheduled examinations was conveyed on paper; the patient information had to be entered manually at the modality. Images were only documented on film.

In the networked environment all information is now passed on electronically, from the patient's admission to the electronic distribution of the radiological report to clinicians.

The usage of the DICOM Services Modality Worklist, Modality-Performed Procedure Step (currently not implemented for all imaging modalities), Image Storage in conjunction with Storage Commitment assures data consistency as repeated manual input is avoided and prevents loss of data as the PACS explicitly takes over responsibility for images. The automatic evaluation of the MPPS message by the RIS streamlines the workflow because manual entry of data at the RIS terminal is avoided.

The next steps at the Staedtische Klinikum Goerlitz will focus on the improvement of

the MPPS connection as well as on reporting, image distribution, and remote servicing issues.

Shorter Examination Time

At the Johannes Gutenberg University Hospital in Mainz, Germany (1 500 beds, 120 000 exams per year, more than 30 imaging modalities such as MRI systems, CT scanners, ultrasound equipment from different vendors, and a major PACS), different transactions are solved with IHE-compliant services including DICOM MWL, MPPS, Storage Commitment, Structured Reporting, and DICOM N services for database update.

The integration of different systems (RIS, modalities, PACS) with MWL and MPPS improved workflow significantly. Especially in digital radiography where MWL is necessary to shorten examination time. The MPPS interaction was improved in a way that all examination data, i.e. performed protocols, used materials and eventual exposure data, are documented. This helps omit reentering the same information into the RIS manually and maintain the integrity and consistency of data across all systems.

Error Reduction

The Hospital Nuremberg, which was founded in 1897, is a teaching hospital of the University of Erlangen with 2 500 patient beds, making it one of the largest community hospitals in Europe. Since 1994, the hospital has been running two locations: one in the north and one in south of Nuremberg. In the north site (more than 35 buildings, 1 500 beds, 70 000 inpatients annually) 80 000 exams per year are performed for the departments of thoracic and abdominal surgery, pneumology, obstetrics, gastroenterology, oncology, geriatrics, urology, ENT, ophthalmology, endocrinology, psychiatry, hemostasiology, radiotherapy, and nuclear medicine. In the past three years, several IHE transactions were implemented in a step-by-step approach to integrate products from more than ten vendors, including DICOM Store, MWL, Storage Commitment, Q/R and Print. All modalities are connected to PACS and workstations

using DICOM Store, even the legacy systems (using frame grabbers).

Within the IHE Scheduled Workflow Profile the DICOM MWL is implemented on all modalities (except for the two legacy systems). The HIS is HL7 based and uses a communication server to provide the DICOM MWL for the modalities. Improvements gained were a reduced number of mistakes relating to patient and study demographic errors, no loss of images or reports due to simultaneous availability at several locations, enhanced patient throughput, reduced labor costs, and film cost reduction by 80* percent due to soft-copy reading (the use of films has been limited to referring physicians only).

Toward the Future

The medical imaging center of the Centre Hospitalier d'Arras in France gathers activities of general radiology, echography, numeric angiography, mammography, vascular radiology, CT, and MRI. More than 66 000 examinations are performed there every year.

In November 2001, the medical imaging center chose the new HIS Clinicom from Siemens, which went into production in May 2002. As another process milestone in installing an integrated environment, the RIS Sirilog from Médasys and the OR Management System Blocqual from XRPartner were introduced in June 2003. The next steps will be the connection with GP in the third quarter of 2004, as well as optimizing the laboratory interfaces and installing PACS and an image network.

These user success stories are just some of the examples that show how well the IHE Initiative works together. Hopefully there will be many more to come from all over the world.

For further information see the RSNA-IHE web site:
<http://www.rsna.org/IHE> or
www.siemens.com/IHE

* Results may vary. Data on file.



THE HOSPITAL NUREMBERG is a teaching hospital of the University Erlangen-Nuremberg and integrates different modalities and systems from more than 10 vendors.