

IHE SUCCESS STORY

DICOM Image Capture at the Lahey Clinic



SUCCESS SNAPSHOT

Lahey Clinic
Burlington, Massachusetts

CHALLENGE:

- Clinical images and information are confined in isolated databases associated with each instrument
- Databases where images are stored are not backed up in a consistent and fail-safe manner
- Images are not integrated with the practice's (or hospital's) information system

SOLUTION:

Medflow Electronic Health Record (EHR) created specifically for eye care practices was the EHR of choice for the Lahey Clinic. Medflow championed a standard-based image management system designed for interoperability under the Integrating the Healthcare Enterprise (IHE) and DICOM (Digital Imaging and Communications in Medicine) frameworks. Medflow followed the direction of the American Academy of Ophthalmology, a strong supporter of IHE and DICOM.

STANDARDS-BASED PROFILES IMPLEMENTED:

IHE Profiles based on IHE eye care domain: Eye Care Workflow (EYECARE)

RESULTS:

- A modality Work List (MWL) appears on the device directly, eliminating the need to move to a separate Medflow Image Capture Station.
- The images store meta-data containing pertinent demographics, MRN and other key information.
- The expense and real-estate requirements of installing a separate Medflow Image Capture Station in the exam room are eliminated.

BACKGROUND: DICOM Integration Functionality

Lahey Clinic

Lahey Clinic is a 550 physician multispecialty group practice with offices throughout eastern Massachusetts. The Department of Ophthalmology, comprised of 15 ophthalmologists and 7 optometrists, has three offices located in the outlying suburbs of Boston. Over 80,000 outpatient patient encounters are seen annually. Similar to other practices, the department has increasingly become dependent upon imaging devices including 4 visual field machines, 4 optical coherence tomography units, A and B scanners, 6 fundus and slit-lamp cameras, 3 IOL Masters, ORB scanners, topography units and a specular microscope. The equipment is manufactured by many different companies and was acquired at different time points. Therefore, even when there is overlap between equipment at the different sites (IOL master, OCT), they are often using different versions of the operating programs.

The search for an eye care specific EMR (electronic medical record) and PACS system began in earnest in the summer of 2007. Lahey's search identified several vendors with possible solutions. The search was later narrowed to two possible solutions, one of which was Medflow, Incorporated. As opposed to a proprietary image management system, Medflow championed a standards-based image management system that was designed for interoperability under the IHE and DICOM frameworks. Medflow closely followed the direction of the American Academy of Ophthalmology (AAO), a strong supporter of the IHE and DICOM. "To foster standardized methods for exchange of digital clinical data in ophthalmology, the Academy (AAO) has been working with several standards-based approaches to facilitate the use of digital imaging in ophthalmology. The Working Group on Ophthalmic Standards was formed with the support of the Academy (AAO) in collaboration with vendor and user groups, to foster the development and implementation of standards that facilitate the exchange of digital information in eye care environments." Medflow was one of the vendors that participated in the Working Group.

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CHALLENGE:

Processing, Storing and Retrieving Images and Data in a DICOM repository

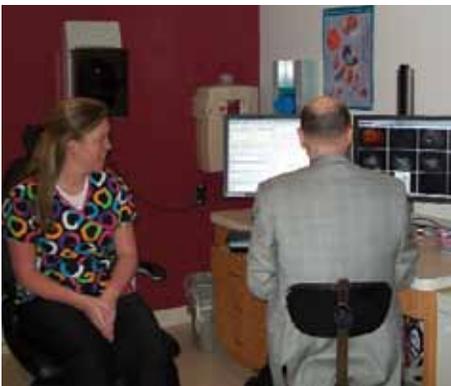
Major challenges exist in managing the images and associating them to the corresponding patient and visit. Paramount to this process is a need for direct communication from one ophthalmic device to another in order to compile data from all aspects of a patient visit, an access point where all of the information could flow, and an organization and tailoring of such information to associate with each individual patient. Without the ability to handle, store, print and transmit data, the information collected is not maximally utilized.

One of the major problems faced by most ophthalmology practices is that the clinical images and information are confined in isolated databases associated with each instrument. Compounding the problem is the fact that these databases are usually not backed up in a consistent and fail-safe manner nor are they integrated with the practice's (or hospital's) information system allowing them to receive valid admission, discharge and transfer (ADT – Patient Demographics) data. As a result, patient identifiers, such as MRN and demographic data that are assigned to procedures, can be inconsistent with the practice's or hospital's information system (HIS). Furthermore, when images need to be reviewed post-procedure, it is necessary to go to the physical location to retrieve them costing both the patient and the physician valuable time and resources.



SOLUTION:

Preparation and Implementation of the Image Management System



The Director of Enterprise Imaging at Lahey Clinic, Boris Zavalkovskiy, Ph.D, an early contributor to defining the DICOM standards, assigned Informatics Project Manager George Szarka, MS-MOT to manage the Medflow Imaging Project.

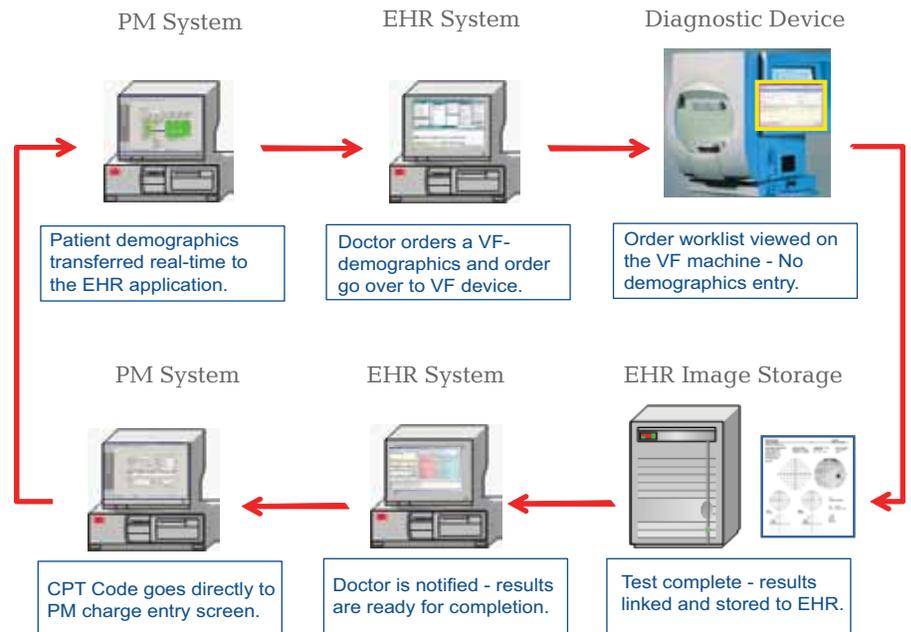
George, a seasoned IT Project Manager, began by working with Lahey's Ophthalmology Department to compile a complete and accurate inventory list of all of the imaging instruments. The resulting list of equipment was analyzed and a determination was made regarding which devices would be targeted to integrate with Medflow Imaging via DICOM.

It is important to realize that the ophthalmic instrument vendors have only begun to develop DICOM integration functionality into their device software over the last year. This integration is an option that requires the instrument to operate on the most recent software revision. In order to bring the older instruments up to the required level, software and hardware upgrades may be necessary as was the case at the Lahey Clinic. Lahey upgraded Zeiss IOL Masters, Zeiss OCTs, OIS Winstation system, and Topcon ImageNet 2000/2000 Lite systems. While the expense to perform these upgrades is not insignificant, the benefits derived from achieving DICOM connectivity to the Medflow Management system greatly outweighs the cost.

INTEROPERABILITY IN ACTION: Standards and Profiles

Eye Care Workflow (EYECARE) manages eye care workflow including ordering, scheduling, imaging acquisition, storage and viewing.

This diagram shows the interaction between the physician and the diagnostic device, and the direct communication that follows between the diagnostic device and the EHR. Direct communication with diagnostic devices from the EHR system saves resources and eliminates human error allowing access to data anytime and anywhere.



RESULTS & BENEFITS: Benefits Derived from Achieving DICOM connectivity

Some of the benefits of archiving images in standards-based DICOM-3 are summarized below:

- The images are no longer confined to a specific system, and if the originating system is replaced, the images remain available.
- The images store meta-data containing patient demographics, MRN and other key information. If the originating system's database gets corrupted, which occasionally happens, the images are still identifiable.
- The images can be stored in an Enterprise Image Archive, making them accessible to authorized personnel via the hospitals' EMR (Electronic Medical Record).
- A Modality Work List (MWL), or list of orders for diagnostic exams, appears on the device directly, eliminating the need for Technician or Photographer to move to a separate Medflow Image Capture Station to select the order associated with the specific patient and exam. This saves time and thereby improves patient throughput.
- The expense and real-estate requirements of installing a separate Medflow Image Capture Station in the exam room, which are usually restricted in terms of space, are eliminated.
- The Image quality obtained by direct DICOM storage is superior to that obtained by screen-capture methods used by non-DICOM storage techniques.

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TESTIMONIAL:

Jeffrey Marx, MD,
Chairman of the Department of Ophthalmology at Lahey Clinic

"Medflow's image management system allows providers to view images from all of our satellites immediately comparing these tests in a timely and efficient manner. Using DICOM, we are assured that the correct patient images are available for review with no chance of misfiled images so common with other modalities. The image management system has improved the care we provide patients while maintaining efficient patient flow."



HOW CAN INTEGRATING THE HEALTHCARE ENTERPRISE (IHE) HELP YOU?

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Use of IHE-based systems is a wise choice because IHE provides a proven foundation to support a connected healthcare environment by solving the interoperability challenges faced by today's healthcare providers. Most clinical settings use a wide variety of systems and modalities from different manufacturers and as a result, exchange of patient data is a significant challenge.

IHE provides a solution via a common framework, referred to as IHE "Profiles" that enable the coordinated use of established standards such as HL7, DICOM, OASIS, and many others. IHE profiles address critical interoperability issues related to information access for care providers and patients, clinical workflow, security, administration and information infrastructure. IHE also defines a process by which these profiles are subjected to rigorous validation and conformance testing.

Together this framework and process result in health IT systems that are able to communicate with one another better, are easier to implement, and allow care providers to more effectively use information.

Why IHE?

Use of IHE helps clinical end-users resolve interoperability challenges. The ability to efficiently and securely access and exchange patient health data has long been a difficult challenge to resolve. Now with the addition of new incentives such as demonstrating "Meaningful Use" in the United States and similar mandates elsewhere in the world, IHE provides a proven solution to resolve health IT interoperability challenges. Use of IHE enables a collaborative environment between healthcare providers and industry leaders to improve the effective and secure exchange of patient health information.

Benefits of using IHE-based Systems for Hospitals and other Enterprise Clinical Settings:

- **Fewer interfaces:** It's not unusual for a 100-bed hospital to have dozens of interfaces - with IHE-based systems the need to create and maintain costly interfaces is greatly reduced.
- **Meeting reporting requirements:** Products developed using IHE can help end users more easily meet reporting requirements such as Meaningful Use in the United States and similar requirements worldwide.

Benefits of Using IHE Frameworks for Health IT Product Developers:

- **Reduce and improve product development cycles:** By implementing IHE, vendors can streamline their product development cycles by leveraging this integration capability across multiple customers, thus allowing staff to focus more attention on creating new product features and functions.

Founded in 1997 by HIMSS and RSNA, IHE is a global non-profit organization with stakeholder engagement of hundreds of volunteers representing the healthcare community worldwide.

Learn more about how IHE can help you, visit www.ihe.net or email secretary@ihe.net.

