



A Real-World Radiology and Enterprise Imaging Implementation at Mayo Clinic— in Concert with the Electronic Medical Record

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Background/Problem Being Solved

In support of the implementation of a new EMR, the problem to be solved was how to “image-enable” the EMR. Our definition of an image-enabled EMR is an *“EMR implementation that supports – from the EMR - workflows to acquire, distribute, manage, and provide access to all medical images created within the institution and received from outside the institution”*.

Interventions

Prior to implementing the EMR, <institution> already had a VNA in place, with all of the historical medical images for all departments available.

Our first step was to work closely with our new EMR vendor to understand what imaging services were available from the EMR, and what was needed by the EMR to support departmental workflows that generated, or consumed images. We also considered other services, like image viewing from desktop and mobile EMR environments, patient access to view their images from the patient portal, image exchange services as well as the historical imaging exams, and how to make them known by the EMR under the right department, and available to view.

The result of that effort was an “Enterprise Imaging Framework” that specified the infrastructure (EMR, VNA, Image Viewers, Image Exchange Gateways, etc.), their role in the framework, services each would provide, and defined how we would implement the EMR-Enterprise Imaging Integration for 4 areas: 1.) Departmental Image Acquisition and Services, 2.) Image Viewing, 3.) Image Exchange, and 4.) Imaging Results (the images themselves, as well as the reports and other artifacts that were created during the workflow). Consideration was given to orders, and non-orders based imaging workflows, outside images, historical images, and medical photos.

The implementation framework also included support for the radiology effort to collapse 9+ PACS systems, each with its own unique RIS, to a single EMR/RIS, and single PACS, with access to all Radiology images across the enterprise.

Outcome

The implementation completed in the Fall of 2018 following a 3-year effort. Twelve departments use orders-based workflows for imaging procedures. The others use encounters-based workflows. All of <institutions> medical images, historical, new, and outside, are known by, and available for clinicians to view in the EMR from both desktop and mobile environments. A single, Radiology EMR/RIS-driven PACS is implemented across the enterprise, with the full jacket of each patient’s <our institution> Radiology and Outside images pre-fetched with their ordered procedure.

Conclusion

The EMR has become the focal point for most departmental imaging workflows. All of a patient’s <institutions> images and outside images are known by and available to view from the EMR. Radiology has the entire Radiology patient jacket, including outside exams, available on their Diagnostic workstation when reading an exam.

Statement of Impact

Having a single EMR, single Radiology PACS – both integrated with the VNA and Clinical Image Viewer, has enabled Radiologists and Clinicians to have a complete view of the patient imaging history from the EMR, and in their diagnostic tools. This is a good thing for patient care, and opens up new possibilities for real time consults, augmented health tools, and work sharing.

Keywords

enterprise imaging, clinical image viewer, vendor neutral archive, EMR, enterprise imaging framework, image exchange