

Medical Imaging and Meaningful Use

How should diagnostic images fit into the CMS vision of EMRs and reimbursements?

By Jeanne-Marie Phillips
and Steven Washer

For better or worse, healthcare reform has arrived, and with it comes a contentious debate about the certification of electronic medical records (EMR) systems for meaningful use. Managing large medical image files has long been a challenge even within radiology, yet diagnostic data would seem essential to a physician's treatment of disease.

How should diagnostic images and related data fit into the Centers for Medicare and Medicaid Services' (CMS) vision of meaningful electronic patient record management and the lucrative reimbursements to medical practices and hospitals that will follow? In the following article, five experts jump into the debate and answer some key questions.

1. Do you feel medical imaging is receiving appropriate emphasis in the current legislative discussions about meaningful use?

**Nicholas Christiano Jr.,
Advanced Radiology Consultants:**

Medical imaging has been a front-runner in interoperability data standards and the workflow automation process. Under the current discussions, imaging's role has been significantly reduced or disregarded under the assumption that this particular discipline is

already heavily leveraged, and that subsidy funding should be targeted towards those disciplines that have been slow to adopt technology.

This is unfortunate, since in any adoption process there must be a balance between "early-adopter" and "slow-to-adopt" physicians to keep the forward momentum. Without any subsidization of imaging, the medical field could lose the "next generation" in medical automation model.

Mitchell Goldburgh, InSite One Inc.:

No, quite the opposite, given that the primary function of imaging is screening and diagnosis to rule out specific disease pathologies during patient care. The focus of meaningful use actually fails to address the issue of quality and utilization by not including medical imaging.

Diagnostic imaging has been emphasized in the current legislative actions, but it is a negative response to the current rapid adoption of imaging as a primary diagnostic tool. The strategy to decrease payments for imaging services attacks the technical component of certain nonhospital advanced imaging services, which puts a focus on modality utilization in acute care facilities only.

The 2010 Medicare Physician Fee Schedule final rule had adopted a 90 percent utilization rate, doubling the

requirement for certain imaging equipment phased in over a four-year period. This requirement, coupled with the economic downturn which is reducing imaging volumes overall, has had a significant impact. It has begun to drive many nonhospital imaging sites out of business or has created the need for alternative operating models — strategies where imaging is more tightly integrated into the clinical workflow of acute care facilities, a HIE (healthcare information exchange) model.

Henri "Rik" Primo, Siemens Healthcare:

The meaningful use matrix plans for the inclusion of images in the electronic health record (EHR) in 2015. This is relatively late, but probably realistic, since other functionality provides the basic building blocks to create an EHR, including computerized physician order entry (CPOE). Hospitals that already have an EHR could implement image access much earlier, which would be welcomed by all EHR users.

Tim Kulbago, Merge Healthcare:

No, absolutely not. With decades of development in radiology information systems (RIS) and picture archive and communication systems (PACS) solutions, the medical imaging commu-

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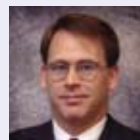
Nicholas Christiano, Jr., chief administrative officer, Advanced Radiology Consultants



Mitchell Goldburgh, senior vice president, marketing and business development, InSite One Inc.



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Tim Kulbago, general manager, Merge Healthcare

Hossein Pourmand, vice-president, business development, Candelis Inc. *Photo not available.*

nity has invested heavily in moving to electronic recordkeeping. Although the majority of radiology now operates in a digital environment, we are not being given credit for our efforts.

Last summer, as it set out to develop its “meaningful use” criteria, the Office of the National Coordinator (ONC) for Health Information Technology sought input from various disciplines. Radiology, as a discipline, was not approached.

It became clear that the radiology community needed to get involved. A group of representatives from radiology providers and vendors joined with the American College of Radiology (ACR) to form the Imaging e-Ordering Coalition.

In addition to advocating for use of electronic clinical decision support in lieu of a radiology benefit management model, this entity established a Provider Roundtable subcommittee. Its focus included development of a meaningful use matrix that illustrates how imaging is part of the care continuum and shows how imaging technology complements the proposed health information technology (HIT) movement.

Hossein Pourmand, Candelis Inc.:

No, and it is rather surprising, given the fundamental role that medical imaging plays in medicine and the fact that so much of medical imaging data is already digital and standardized.

It seems that legislative discussions about meaningful use have stopped at radiology reports. By “image-enabling” EMRs, physicians are able to have a comprehensive view of a patient’s medical history and records, resulting in better patient care. The list of reasons why there should be more emphasis on medical imaging in the meaningful use discussions is both long and compelling.

2. If images are included in an EMR, should these be diagnostic or lower-resolution, referral quality?

Christiano:

Except for certain specialties, for example orthopedics, lower-level images should suffice, since the radiologists’ in-

terpretation is the value-added portion of the transaction. Diagnostic quality would drive the overall cost to the referring physician in terms of faster bandwidth, more intense and complex CPU processors and increased storage capacity.

The overall impact could double or triple the cost for the referring physician to purchase a computer EMR system in direct opposition to promoting the adoption of technology by physicians. An alternative approach would be the ability for the EMR system to “pull” a diagnostic-quality image from an existing PACS system using a unique patient identifier when required.

Goldburgh:

Both should be accessible within the EMR. Any system that restricts clinical access to either can interrupt workflow or cause delays in delivery of healthcare.

The “use cases” for imaging are important as part of an EMR. For example, in the case of invasive planning, there may be additional tools required for specific imaging modalities, such as cardiac or orthopedic measurement tools. Cardiologists and orthopedists would interact with the tools that can create support issues for the general user.

Our experience with use case is that the majority of the users have minimal needs that can be expanded with specific privileges as required.

Primo:

The answer depends on the required functionality. While some users may only require the key images and a report, others may well require full diagnostic resolution (e.g., while planning brain surgery). The advice is thus not to duplicate the storage of images in the EMR, but to enable the EMR, e.g., through application program interface (API), to call up the images from the PACS archive.

Kulbago:

This is a question for healthcare providers, not one vendors should be making. There are new technologies that are based upon customer input and provide

options. In this context, each provider can evaluate and deploy solutions in a way that makes the most sense for their organization and their patients.

Pourmand:

Ideally, diagnostic quality. However, given the size of certain images and studies, this could pose a challenge, given the already taxed networks at many facilities.

3. From an information technology (IT) perspective, how would you approach imaging/EMR integration?

Christiano:

Many other industries have already tackled this problem of mixed modalities, which is the case with imaging. For example, in the personal banking world, you can interface a home banking application to your online banking system and schedule and pay bills, transfer funds or review a transaction. If you need to see a cancelled check, you can click on that transaction and the image of the check (front and back) appears in a separate window.

The same applies between a referring physician’s EMR and an imaging center. The discrete values that are part of a structured report are electronically imported into the key fields of the EMR and the image (if required) can be pulled.

Goldburgh:

There are two elements at work — access and storage. Access has historically been through proprietary interfaces to primary applications. This has two major faults – complexity and cost.

Complexity stems from a combination of the interface development, its maintenance and its inherent security limitations. More importantly, it pushes the workflow of a clinical area and the toolset of specialists into the realm of the clinician who, as an occasional user, puts high demands on application support.

Recently, industry pundits have embraced the strategy of a universal viewer available within the EMR that provides access to imaging data with functionality that apply across all “ologies.” This

universal viewer simplifies support issues and addresses the single sign-on, while maintaining full security.

For long-term storage, the management of fixed content is best served in a centrally managed environment that services EMRs and primary clinical applications. This provides performance, enhances security, simplifies management of data elements and is inherently more scalable than approaches that keep fixed content within the structure of the EMR.

Primo:

Again, we recommend that images reside in the PACS and enabling the EMR to call up the images through an API or repository with metadata.

Kulbago:

We strongly believe in the value of a standards-based approach to integration. The Integrated Healthcare Enterprise (IHE) initiative, sponsored by RSNA, HIMSS and other leading associations, has created a comprehensive set of integration framework documents that outline end-to-end care workflow in terms of key integration points and information-exchange transactions. Relying on well-established HL7 and DICOM communication standards, the IHE uses industry-wide experience in the most-common, best-practices information work flow.

The alternative — custom interfaces between the RIS and/or PACS and the EMR/EHR systems — can be costly and result in an infrastructure that may be difficult to maintain or extend. Routine software upgrades to the EHR, RIS/PACS or other systems can cause long projects focused on revalidation of the customized interface. Since custom interfaces are always vendor-to-vendor and often site-specific, this work is not reusable. An individual hospital or clinic bears the total cost of the effort.

While IHE integration frameworks provide a foundation for solving many system integration problems, there are practical challenges with “plug-and-play” IHE-based integration. An integrator and/or IT leadership would need to ensure that all vendor systems maintain the same level of HL7 and DICOM compliance and that

they have all successfully completed relevant tests at a recent IHE Connectathon.

This may not be practical, since most information systems at a hospital, clinic or an imaging facility move on separate life cycle phases. Such comprehensive IT implementations require significant workflow change, which disrupts care delivery.

Standards-based connectivity, open architecture and rapid development capability offer a quick way to integrate existing systems. Integrators should consider an approach that provides an optimal use of existing levels of HL7 and DICOM compliance, while also using IHE integration frameworks as a best-practices foundation.

Pourmand:

From an IT perspective, a successful integration of imaging and EMR has to take into consideration bandwidth requirements and limitations, as well as hardware requirements. In some facilities, the radiology department may have more robust IT infrastructure and bandwidth given a radiologist’s need to access studies quickly and efficiently. Furthermore, hardware requirements for EMR are not as stringent as for medical image viewing. As such, without proper planning, EMR-user experience with images and studies may not be ideal.

4. Should reimbursements be provided for IT solutions that will help the healthcare system guide decision-making about ordering appropriate imaging exams?

Christiano:

Decision support/order management systems push critical information to the key decisionmaker, the referring physician. This approach has the most positive impact in modifying physician ordering patterns, as it will be rooted in evidenced-based protocols and results that are presented to the physician at the time of the initial order.

If the referring ordering physician is presented with alternatives and data based on past practices, the probability of a more appropriate procedure for the patient is increased. This not only reduces unnecessary testing, but also minimizes

the overall cost of care while improving the clinical turnaround time.

Goldburgh:

Yes, however it is a question of balancing adoption, effectiveness and outcomes. Clearly, adopting technology and therefore getting reimbursements for implementing technology for technology’s sake is not the right investment and, in fact, can create silos of information. We believe that investment in healthcare technology must have an operational benefit, such as measurable improvements in access for clinicians or in sharing of information with the patient for personal health records.

Primo:

We endorse this approach, but we trust our legislators to make the right decisions. At the end of the day, the goal is to provide the caregivers with the best imaging information available, while making decisions on exactly what images are needed in a knowledge-based framework of medical indication and appropriateness, cost factors and ionizing radiation management.

Much of this decision-making process is currently based on publications and textbooks that outline guidelines for best clinical approaches. Automating this process will deliver the correct information faster and with less variability to the caregiver.

Kulbago:

Yes. Research has shown the effectiveness of electronic clinical decision support. We believe that the effective use of these systems, including integration of industry standard appropriateness criteria, offers an opportunity not only to improve quality of care, but also to improve efficiency.

Pourmand:

Yes. Diagnostic imaging is a major component of the cost of healthcare, and the legislative approach up to now has been on cutting reimbursements instead of finding ways to make the system more effective and efficient.

One of the issues in medical imaging is duplicate exams, which are not only cost-



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ly but also unnecessarily expose patients to radiation. IT solutions that provide a more comprehensive view of a patient's history, including accessing past medical images as well as reports, should be eligible for reimbursement.

5. Has your company taken steps towards facilitating the availability of images and imaging data to existing EMR systems?

Christiano:

Given the different number of EMRs available in our regional marketplace, along with the high number of referring practices yet undecided on an EMR solution, Advanced Radiology Consultants decided on a two-pronged approach.

For referring practices with an EMR already in place, we acquired and installed an HL7-based interface engine. This interface engine enabled a single bi-directional feed from our RIS/PACS solution into the engine with customizable HL7 bi-directional feed to the referring physician's EMR.

For those referring physician practices without an EMR, we provided a thin-client, soon to be Web-based, physician portal in their offices for the viewing and retrieval of patient images and interpretations.

Goldburgh:

Yes. We have been delivering our In-

Dex Web solution based on secure access via a URL API. This allows InDex Web to offer a single sign-on via the EMR while still protecting log-in access to imaging data.

In this context, imaging is a broad category – the useful life of a diagnostic image may be high during the acute care phase of a patient, but dramatically drops off in lieu of clinical reports across the spectrum of EMR users. InDex provides a universal viewer that encompasses reports, clinical documents from HIEs, JPEGs and DICOM viewers.

Primo:

Our PACS and RIS systems can be accessed by the EMR through an API. The API provides the call to the PACS with the correct patient context, so that the correct images and reports are opened without the necessity of manual selection.

Kulbago:

Yes. Merge has created what we believe is the first genuine zero-client approach to image distribution. Extending beyond “chubby” and thin-client approaches, our zero-client platform overcomes wide area network obstacles that prevent smooth and efficient connectivity between PACS and EMRs.

This is a standards-based approach that requires basic Web integration and holds great promise to cost-effectively enhance patient care and

improve workflow efficiency, especially across disparate healthcare providers. Additionally, Merge Healthcare has recently launched a cloud-based interface engine for HL7 integration.

Pourmand:

Yes. Given that EMR systems are not typically designed to handle large studies in DICOM format, we offer our customers two ways to integrate our ImageGrid RIS/PACS with their EMR.

Our HL7 interface has been successful in providing bi-directional integrations for radiology orders, status changes, cancellations and result updates. Patient study reports generated in our RIS or PACS can be sent via HL7 message into the EMR. The reports, along with any embedded key images, will now be part of the patient's EMR.

For access to actual images and studies from within an EMR, we have developed an API-level integration protocol, which provides the ability to seamlessly launch our full-featured ImageGrid radiology viewer, general radiology viewer, mammography viewer or referring physician viewer.

The first three are FDA 510(k) cleared and can be used for diagnostic purposes in conjunction with appropriate medical-grade displays. The referring physician viewer is a Web-enabled DICOM viewer that allows physicians to open and view the entire study in DICOM format. 