The Convergence of Healthcare IT, Radiology & Cardiology
On March 23, 2010, the Affordable Care Act was passed by Congress and signed into law by the President. The Supreme Court rendered a final decision to uphold the health care law on June 20, 2012. There’s a saying, “The only constant is change.” At no time since the advent of Medicare have we in the healthcare industry witnessed the level of change the Affordable Care Act will bring about.

While much of the reform is focused on creating a more patient-centric delivery system, at the core of the Affordable Care Act is healthcare payment reform. The most pressing question then, is how can radiologists and other health care professionals both adjust to and help to support this reform, without sacrificing patient care? Especially in an environment of decreasing reimbursements and increasing demands?

We’ve compiled highlights from our blog, Medical Imaging Talk, to help answer this very question. From tips on improving operational efficiencies by collaborating with IT, to selecting a healthcare IT vendor that will understand how to streamline referrals and billing, our primary purpose with this e-book is to provide you with a complete understanding of the evolving digital enterprise.

We live in exciting times. We’re sitting on the entrance ramp of the next technological era and, we firmly believe, healthcare reform is paving the way for the road ahead – by ensuring better patient care and stronger revenue streams for hospitals and health care organizations that embrace accountability and affordability.

As Lisa Ghent, medical imaging product marketing specialist at McKesson states in her contribution to this e-book, radiologists need to see beyond the images they display and read. “We must dive into the stories that patients bring to truly understand the importance of what we do and to have the insight to innovate.”

We hope this e-book provides you with the insight you need to make informed decisions and succeed during our time of change.
# Table of Contents

5 Ways to Streamline Radiology* .................................................................................................................. 3
RSNA 2012 Recap: Radiology Imaging, Patients First .................................................................................. 4
Weighing the Reward of Radiology Information Systems ............................................................................. 5
How to Select A Medical Imaging Technology Vendor That Won’t Miss The Forest for the Trees .......... 6
IT & Radiology Work Hand in Hand* .............................................................................................................. 9
Radiology PACS Reduces Repeat Procedures Per Recent AJR Study .......................................................... 10
Using Checklists to Keep Radiology Patients Safe* ................................................................................... 11
Medical Imaging Professionals Must Show Meaningful Use ........................................................................ 13
5 Reasons Radiology Collaboration is Better* ............................................................................................. 14
5 Ways to Streamline Radiology*

Reduced reimbursements for medical imaging represent the “new normal” in the wake of recent healthcare reform. But leveraging an RIS/PACS efficiently can actually improve your bottom line. Here’s how.

The future of radiology probably won’t be much like it’s recent past. To be specific, the age of perpetually large volume growth of radiology is probably over, and fee-for-service payment systems will become less prevalent.

Without reliable volume and predictable income, how can radiologists plan for a secure financial future? According to this article from HealthData Management, an RIS/PACS can be a crucial part of streamlining radiology procedures and thus improve the bottom line. Here are five ways that an RIS does this:

1. **Streamlining Referrals.** An RIS/PACS can be used to directly interface with any number of EHR systems, making it easier for ambulatory clinics to a) Order radiology services and b) Incorporate radiology results into EHRs. Such a direct, digitally-based connection also reduces time-consuming paperwork and faxing.

2. **Maximizing Improved Network Speed.** An PACS doesn’t care whether it receives images quickly or slowly – but radiologists do. Get the most use out of an PACS by boosting network speed. The download difference – 20 seconds per x-ray instead of two minutes – can make huge differences in productivity.

3. **Streamlining Billing.** An RIS can directly interface with on-site or off-site billing programs, reducing the number of man-hours (and paperwork) devoted to the complicated set of hoops between a procedure and a proper invoice. In many cases, an RIS can even pave the way to using a billing service, eliminating billing personnel (and substantial expenses) altogether.

4. **Unifying PACS.** For radiology practices that service many different clients, having a system that can interface with different PACS is crucial. The right RIS can essentially reduce several different interfaces to one, enabling radiologists to focus on actually interpreting images instead of navigating different software protocols.
5. **Use the Cloud.** Information storage...the final (and continually expanding) frontier of IT, especially for picture-heavy applications like RIS and PACS. By storing information at a secure offsite location, radiology practices can let someone else's server (and IT team) manage massive amounts of data and – more importantly – enable their radiologists to access images from just about anywhere.

**RSNA 2012 Recap: Radiology Imaging, Patients First**

*Dr. Richard Gunderman proposed an intriguing concept to Radiologists in attendance at his talk at RSNA 2012. He believes that improving radiologists’ level of engagement will provide not only the insight to innovate and achieve better patient outcomes but also increase profitably despite increasing complexity. McKesson product manager Lisa Ghent shares a summary of Dr. Gunderson’s presentation below:*

It’s not the first time the concept of patient-centered radiology has been proposed, but what does it really mean? It is hard sometimes to marry the alluring idea of patients being top priority with the need for Radiologists and hospitals to be profitable, all while meeting the complex requirements of state and national legislature.

Richard Gunderman, MD, PhD from Indiana University, a respected radiologist, professor and author gave a lecture Tuesday Nov 27 at RSNA called “The Story Behind the Image.” The concept behind his presentation was that we are missing a degree of engagement in *radiology imaging* that is preventing us as a collective from achieving excellence. He believes this hinges on our ability to see beyond the images that we display and read; that we must dive into the stories that patients bring to truly understand the importance of what we do and to have the insight to innovate.

This is an interesting concept, given that most radiologists engage very little with patients personally. How would a radiologist go about discovering the stories of their patients, and where does that actually fit into and impact the quality of patient care? We have already made great strides as technology providers, for now we can give a full patient medical record within the regular imaging diagnosis workflow. Dr. Gunderman’s opinion is that while this allows radiologists to be precise, it does not necessarily allow them to be accurate.
He feels that by delving into the stories of their patients, radiologists are able to redefine what they do and fundamentally who they are as physicians, and that this discovery will make them better doctors. I am intrigued about how this concept could impact technology providers.

What if we spent more time understanding radiology imaging from the perspective of the patients; not how their order is processed or how they are checked in but who they are and what they’re about? Would this provide us with the ability to discover approaches to health care informatics that could revolutionize the industry and excite patients and providers alike? I’m not sure that it’s possible or even realistic, but I am intrigued.

Weighing the Reward of Radiology Information Systems

Advancements in radiology scans have led to an unprecedented level of patient care, while nearly ending the need for exploratory surgery. But can these advancements become too much of a good thing when weighed against the lifetime risks of radiation exposure? McKesson product manager Dave Phillips shares his thoughts in the following post.

Employing computed tomography (CT) scans has both advantages and risks. CT has led to revolutionary enhancements in the diagnosis and treatment of many diseases, as well as nearly ending the need for exploratory surgery and many other invasive procedures. The risk involved is that a CT scan delivers 70 times as much radiation as a chest x-ray.

Measuring Lifetime Health Risk

Recent articles on the dangers of radiation exposure have focused on how CT increases a patient’s risk of developing cancer in his or her lifetime. In order to examine these dangers, lifetime risk metrics were employed in a recent study published in the online journal, *Radiology*. According to Pari V. Pandharipande, MD, MPH, who helped conduct the study, the lifetime risks of cancer from medical radiation may be given too much emphasis when compared to the patient’s current pressing health risks.

Utilizing *radiology information systems*, doctors order imaging exams to diagnose a life-threatening medical condition. According to the study, the immediate risk of death is a vital factor when taking into consideration the benefits of the exam versus the possibility of radiation-induced cancer in the future.
Timing of Risk Is Critical
Dr. Pandharipande argues that “This [timing] must be considered when physicians make imaging decisions for their patients because the timing of risks changes their relevance.”

While modern radiology information systems help improve physician decision-making, it is still up to the individual patient to assess the risk. Dr. Pandharipande adds that “Risks incurred later in life are not the same as those faced in the present. If you had to choose between the chance of incurring a serious risk now or later in life, most people would choose the latter.”

Overestimating Risk of Later in Life Cancers
The study forecasted outcomes in patients with testicular cancer who were undergoing CT exams after orchiectomy. It compared the loss of life expectancy from testicular cancer to life expectancy losses resulting from CT induced cancers with the purpose of quantifying effects of immediate risk as opposed to future risks. In using these lifetime risk metrics, the researchers discovered that it can lead to overestimating the events that may occur later in life.

According to Pandharipande, more research needs to be conducted into patient and provider risk perception.

“Radiation-induced cancer risks, often discussed at the population level, can be challenging to conceptualize and apply to imaging decisions that have to be made at the patient level. We as physicians can benefit from dedicated educational efforts to improve decision-making and better convey the risks to patients,” he concluded.

How to Select A Medical Imaging Technology Vendor That Won’t Miss The Forest for the Trees

Combining departmental knowledge with technological expertise is a crucial step in moving your enterprise imaging out of limiting silos of information and benefit from a fully realized medical imaging workflow. Learn more about what you should look for in a medical imaging or Radiology Information Systems (RIS) vendor in this article from McKesson’s Tom Coppa.

As an industry, we should be long past the question of what we are trying to do; rather, we should be asking how, when and where. Your medical imaging vendor should be guiding you along this path. Unfortunately, in the medical imaging
arena, some Picture Archiving and Communication System (PACS) vendors are notorious for being niche players. They know all the details of what to do at the radiology department level to improve workflow but get so caught up in those details that they fail to understand the big picture of how to spread imaging to the entire enterprise and when and where you store the vast amount of data. You need a medical imaging vendor who won’t miss the forest for the trees.

There are only a handful of companies, my employer included, that are translating their success with trees to the forest. McKesson, for instance, has a breadth of enterprise expertise including EHR adoption, billing and financials. We recognize how to economize and be effective in the ‘ology departments while at the same time understanding how to use the technology to connect your entire enterprise. We’re the kind of partner that can move you away from the silo of trees to the enterprise forest – all while bringing forward the medical imaging workflow benefits already achieved. We don’t neglect the trees for the forest, either.

As you embark on a long-term strategy for an enterprise archive, towards a PACS neutral archive (PNA), keep in mind the following five-point agenda to determine if your PACS vendor is ready to deliver what you need.

1. An enterprise imaging strategy must include an enterprise archive that can accept data from throughout the enterprise. And today’s definition of data has expanded to include all images and words used to see, observe, read and understand to make a patient diagnosis. The definition of enterprise has expanded, too, so all images and words need to be available to patients as well. One viable route to achieve an enterprise archive is a PNA — an image repository or archive that is PACS neutral. Regardless of the PACS the organization uses, images can be stored and retrieved from the neutral archive because it was built to exchange data with disparate systems.

When considering your archive, make sure the data is:

- Readily available. You need to know what it is and where it is stored.
- Correctly identified. You need to be able to view any type of imaging data, including camera or motion, from all the ‘ologies.
- Easily accessed. You need to know what speeds and the technology used to bring it to you.

2. The enterprise footprint has already expanded to include storage, servers,
networking and data centers. Now it comes down to broader participation with imaging. PACS vendors must recognize how much data is in a digital image and how important it is to the whole picture of the patient’s treatment. Many vendors that have proven successful in workflow and diagnosing patients at the departmental level are swimming upstream to take imaging to the enterprise. Make sure your vendor shows you how they are:

- Speaking the enterprise language
- Understanding the vocabulary
- Designing into the environment

3. Workflow gains cannot be forgotten. Your PACS vendor needs to introduce an enterprise archive solution that modifies the technology without breaking the workflow in the departments. As you broaden the enterprise footprint, your vendor must examine the nuts and bolts related to data. The leading questions should be:

- How do we get all of our data into the enterprise archive?
- Where do we put it?

4. Data migration is as equally understood as misunderstood in the market. Some still believe that if you put data in an archive for the enterprise, you never need to touch it again. The reality is we don’t know what the applications or storage requirements are going to be going forward. When your tires need to be replaced, you don’t throw away the car. You change the tires. Migration strategies for moving data out of silos and into the enterprise are also changing and expanding. The fact is that somebody should always be managing the data, and it is highly unlikely that the data will be permanently stored in one location.

Ultimately, where data is stored is a location that the enterprise archive has access to and understands. Whether it is costly or cheap, successful or unsuccessful all comes down to the quality of the data and the expertise available. Find a vendor who can talk to you about:

- How to get data from around the enterprise into a repository
- The importance of DICOM wrapping to manage the standard data everyone wants and the custom data some depend on
- Mass data move versus mass reindexing to save money and time

5. Don’t get lost in the chatter of cloud storage, which seems to be upsetting the market but is clearly a strategy that is here to stay. And there is a reason for that. Before the digital age, we used to put our data in filing cabinets. Now we need more options. The enterprise drives where data is stored. Large organizations continue to
manage their own data centers. What about everybody else? Many are opting to outsource storage to a cloud provider to lower operating cost and capital cost. We have public cloud, private cloud or a blending of the two. Organizations using the hybrid cloud keep a primary copy of the data in the enterprise-owned data center and archive a second copy to the service provider.

If your vendor isn’t at least looking at a private cloud option, they should be. Ask them about the benefits of cloud. These include:

- Security when pumping data outside of four walls of enterprise
- Fast and easy access to data with resiliency and redundancy
- Data ownership to ensure control

Our paths to an enterprise archive may not be identical but every long-term strategy should consider the forest as well as the trees.

care experience. See how establishing standards and cultivating a strong interrelationship benefits the workflow of both departments.

IT and radiology are different departments, but these two disciplines and the technologies associated with them collide in the modern world of health care. The relationship between IT and radiology – both at the human and technology level – can be delicate. When IT and radiology are working together with well-calibrated RIS PACS software, infrastructure and equipment, the results can be astoundingly beneficial, for both patients and their care providers.

Radiologists have come to rely on the machines and systems that store and transport patient images and data. Secure, rapid access of clinical images must be available throughout the healthcare enterprise, 24 hours a day, 7 days a week. That means radiologists rely on information technology staff to upgrade, troubleshoot and maintain PACS and other RIS systems.

Radiologists don’t exactly have control over what IT does, however. And between the different specialties, there can be a language barrier, with IT techs knowing more of the technical side, and doctors knowing more about the medical aspects of how they expect the technology to work. It is important for people in both
departments to understand their respective relationships and responsibilities as they relate to the digital enterprise in order to enhance their interactions.

One way to enhance communication and cooperation is for techs and radiologists alike to spend time with each other reviewing the PACS/RIS systems. Radiologists may invite an RIS administrator to spend an hour or two watching how they work. Allow the RIS administrator to see how care is delivered via the tools he or she helps to maintain.

The IT staff, in kind, might spend an hour or two displaying some of their knowledge and the system’s capabilities. For example, a PACS administrator could possibly demonstrate some of his or her maintenance duties, system reports or even minor fixes. Together, radiologists and IT administrators can not only establish standards regarding hardware, software and security for PACS and RIS solutions, but cultivate a solid relationship that benefits the workflow of both departments.

**Radiology PACS Reduces Repeat Procedures Per Recent AJR Study**

Legal exposure and financial concern are just two of the reasons cited as to why several healthcare systems are still using CDs to view medical images, according to the authors of a recent AJR study. Dave Phillips shares more on how health care organizations can make the evolution away from CDs.

Communications systems are the lifeblood of any hospital, but particularly within radiology departments where the ability to distinguish between benign and malignant findings quickly leads to better decisions in patient care. Forgoing repeat procedures cut costs as well when images are imported to the radiology PACS for transfer patients.

A recent *American Journal of Roentgenology* study, reported on by *Health Imaging*, concluded that repeat imaging of patients who had undergone CT or MRI before transarterial chemoembolization (TACE) were significantly lower than when those images were imported to the PACS. With TACE, the small blood vessels that supply blood and nutrients to the tumor are blocked. Blocking the blood supply slows
tumor growth as does placing a large dose of chemo drugs directly on the tumor.

In transarterial chemoembolization, “...Only 11 percent of patients whose images were imported into the PACS underwent repeat imaging, compared with 52 percent of patients who had outside images on CD or film that weren’t imported. When no outside images were available, 72 percent of patients underwent repeat imaging,” according to Michael T. Lu, M.D. and colleagues at the University of California, San Francisco (UCSF) who initiated the study.

Viewing Images on CD Still Standard
Although the number of outside images imported daily to the PACS doubled between 2006 and 2009, the authors recognized that that there are a number of reasons why institutions may not import outside images, including legal exposure issues and financial concerns.

There’s no question the use of PACS has the support of physicians at UCSF, but old technology dies hard. Importing images from CD has been the standard protocol for years. Besides the concerns mentioned, people are slow to change.

“...We expect that just as film persists many years after the proliferation of CDs, use of CDs will continue. We suggest that institutions planning on implementing Internet-based image sharing also make provisions for importing images from CD to PACS,” wrote Dr. Lu, et. al.

Using Checklists to Keep Radiology Patients Safe*
(No Author Noted)

For radiological interventions, explicit guidelines established by the National Patient Safety Agency (NPSA) work to ensure patient safety is paramount. See how these guidelines can translate into a radiology checklist for your organization below.

The National Patient Safety Agency (NPSA), a branch of the UK Health Department, established safety goals in 2002 to help accredited organizations address specific areas of concern regarding patient safety (Source: NPSA). Medical imaging providers and hospitals in the U.S. can benefit from these standards as well.

While radiology information systems (RIS) manage medical imaging and other data effectively, there’s no substitute for hands-on medical “know how” when it comes to a surgical situation. Specifically, using checklists to determine radiology interventions helps keep radiology patients safe.
World Health Organization (WHO) Safety Checklist
The NPSA has adapted the WHO surgical safety checklist which provides *step-by-step instructions* for radiological interventions. Their explicit “sign in”, “time out”, and “sign out” guidelines read like a Miranda warning, i.e. ensuring the patient’s safety “rights” are being attended to.

Of course, we’re not talking about any crime being committed; this example demonstrates how seriously the NPSA considers safety in the operating room.

**Steps to Take Before Giving Local Anesthetic**
The first stage for radiology safety is for the hospital team to assemble. Then, one member reads aloud the following:

1. Have all team members introduce themselves by name and role.
2. Review essential imaging.
3. Confirm that the procedure site has been marked.
5. Determine if patient has any known allergies.
6. Determine if antibiotic prophylaxis has been administered.
7. Determine if the required equipment is available and in date.
8. Identify any critical or unexpected steps you want the team to know about.

**Steps to Take Before Giving General Anesthesia**
For general anesthesia and before the start of a radiological intervention, the safety guidelines are specific to pre-op and designed to anticipate any critical events that may occur during surgery.

1. Verbally confirm the patient’s name.
2. Identify procedure, site and position planned.
3. Have the patient confirm his or her identity, site, procedure and consent.
4. Have the anesthesiologist complete a machine check.
5. Determine if there’s a difficult airway/aspiration risk.
6. Identify any patient concerns.
7. Determine the patient’s American Society of Anesthesiologists (ASA) grade.
8. Identify specific levels of support needed, e.g. blood.
9. Perform the surgical skill infection (SSI) bundle, if applicable.

**The Sign-out Procedure**
The sign out represents another layer of accountability and should be completed before any member of the team leaves the room. You want to be certain the
procedure and/or any implanted devices have been recorded; all equipment has been accounted for and any equipment issues have been identified and addressed; and that all specimens have been labeled correctly and include the patient’s name.

Medical Imaging Professionals Must Show Meaningful Use

According to Keith Dreyer, DO, PhD and coauthor of The Radiologist’s Guide to Meaningful Use, it’s imperative that radiologists understand the coming “tipping point;” this is the last year to capitalize on remaining incentives. McKesson principal product strategist Allan Noordvyk shares more regarding how to overcome the challenges involved with achieving Meaningful Use.

Meaningful use is a government program that encourages the use and adoption of an Electronic Health Record (EHR) by medical providers, including medical imaging providers, via incentives of up to $44,000 per eligible professional. On the flip side of the coin, starting in 2015, Medicare payment reductions will begin for those that do not demonstrate meaningful use.

Those who end up facing these reductions will fall into two categories: those that are unable to achieve meaningful use and those who are just plain unwilling.

“There is going to be a tipping point for radiology soon. There is still time for radiologists to gain most of these incentives, but the clock is ticking; they really need to have a solution in place by October 2013. We are all headed in the same direction here, and those who choose not to participate are going to find themselves not only noncompliant, but left behind.”

The quote above was shared by Keith Dreyer, DO, PhD, vice chair of radiology at Massachusetts General Hospital in Boston and coauthor of The Radiologist’s Guide to Meaningful Use, in a recent article published by ImagingBiz.

Dreyer’s comment boils down to this: it is absolutely imperative that medical imaging professionals understand that this is the last year to capitalize on remaining incentives.

Five Obstacles to Meaningful Use

In January of this year, the American Medical Association (AMA) submitted formal comments to the Office of the National Coordinator for Health Information Technology (ONC), outlining five problems they perceive with the
implementation of meaningful use, including:

1. No evaluation process exists. An external, independent evaluation is necessary to improve and inform the future of the program.
2. A pass rate of 100% is not “reasonable and achievable.” Failing to meet just one measure by 1% would make a physician ineligible for incentives and subject to financial penalties.
3. The program takes a one-size-fits-all approach, which is not appropriate. Program requirements should be more flexible and better structured to accommodate various practice patterns and specialties.
4. The usability of certified EHRs is not addressed. The EHR certification process should address physician usability concerns.
5. Health information technology (HIT) infrastructure barriers need to be resolved. The health IT infrastructure does not enable physicians to electronically share patient data readily with other healthcare providers. In order to allow an efficient and secure electronic information exchange infrastructure improvement must be a priority.

“It makes no sense to add stages and requirements to a program when even savvy EHR users and specialists are having difficulty meeting the Stage 1 measures,” writes AMA Executive Vice President James Madara, MD. “An external, independent evaluation is necessary to improve and inform the future of the program.”

“If physicians...are unable to securely, accurately and effectively exchange health data about their patients, the promise that health IT holds for enabling high quality and efficient care will be just a pipe dream,” he adds.

For medical imaging professionals struggling with these five obstacles, now is a critical time to focus on overcoming them. Learn more about what you can be doing today to advance your EHR initiative.

To learn more about medical imaging and other related topics, subscribe to the Medical Imaging Talk blog via RSS feed or email, follow us on Twitter or like us on Facebook.

5 Reasons Radiology Collaboration is Better*

When teams work together the ability to communicate, share information, assign each other tasks and share calendars, adds immeasurably to workflow efficiency not only within the radiology
department, but also to the entire clinical environment. Help improve the environment of your organization with our final post below.

Collaboration. It’s a mainstay of the medical environment, with the various departments and people with different skills working together towards common goals for patient care. These goals can be accomplished more easily with collaborative software that integrates with PACS RIS systems.

Collaborative software is designed to help people involved in a common task achieve goals. This type of software helps facilitate teams that work together, whether it is within the same building or even over geographic distances. Collaborative software provides tools that aid communication, sharing information, task assignments, time-management, and shared calendars.

Picture archiving and communication system (PACS) management solutions enable health care providers to acquire, distribute and archive medical images and diagnostic reports throughout the hospitals or clinic. PACS integrates with RIS to create an incorporated RIS/PACS environment that improves workflow and efficiency, not only within the radiology department, but with the rest of the hospital or clinical environment.

What are some of the collaborative benefits of RIS PACS systems for radiology?

- Streamlined workflow through electronic medical imaging records
- Enhanced quality of clinical care and patient safety through faster information transmission
- Better clinical decision making through the easy availability of more comprehensive patient records
- Improved diagnoses by providing referring physicians with patient images as part of a complete medical record
- Augmented productivity to help improve clinical, financial and operational outcomes