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KHI Journal Club

Date	December 2009
Reviewer	Hussein AlSayiegh, BSc.EE, CPAS
Title	Should radiology IT be owned by the Chief Information Officer?
Authors	David S. Channin, George Bowers, and Paul Nagy
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KEYWORDS

PACS, RIS, HIS, DICOM, HL7, IHE, HIPAA, Integration, Service-Level-Agreement

PACS: an imaging information technology solution existing generally in imaging departments in the hospital. Started initially in radiology, it then moved to other departments like nuclear medicine, cardiology, radiation therapy, pathology, dermatology, and endoscopy. PACS is the place where medical images are stored (non-text information).

RIS: radiology information system; radiology data automation system. Location where scheduling, process control, and result reporting is performed within radiology departments.

HIS: hospital information system. An information technology solution whose scope of coverage is the entire hospital or healthcare network.

DICOM: a standard for communicating digital medical images.

HL7: healthcare level seven. A standard message type communication between healthcare devices to transmit data within/across an enterprise.

The problem: PACS was always the sole responsibility of the imaging department (i.e. radiology). However, voices are rising to shift PACS to the main IT infrastructure as part of other information systems in the hospital.

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Argument

“The potential strengths and weaknesses of centralized control of the PACS” JDI Aug 2009

In this article authors stood on two sides of the argument. Side A defends the idea to shift PACS to the broader IT department under the CIO's responsibility. Side B seeks to keep PACS under the ownership of the imaging department. Both authors started listing their supporting points.

GEORGE BOWERS - Side A

Initially, the argument was that PACS is an element of a set of subsystems existing in healthcare enterprise. In order to have a full Electronic Medical Record (EMR) solution, integration of all subsystems (including PACS) is a requirement. CIO's responsibility comes here by making it possible to do so.

Integration projects are one of the most painful ones due to poor communication between different bodies inside the hospital. Standalone systems are irrelevant. Thus, a one might argue that PACS should be a responsibility of the CIO to unify policies that help in integrating the IT environment.

Furthermore, PACS has become widely used by other parts of the hospital. It is an essential part of the treatment plan for surgeons in the operating rooms, cardiologists, ophthalmologists, and many others who need to access medical images through PACS. In other words, PACS has become a shared resource that requires central management to avoid duplication of cost and to assure consistency of service.

This is another trend in medical imaging where imaging IT is showing up outside radiology where all other specialties are trying to adopt DICOM as the standard. Thus, it makes sense to start gathering everyone under one PACS, which fits all (see [Q8PACS Census 2010](#)).

Management of PACS environment has become very complex. Introduction of regulatory requirements mandates things like security, privacy, accountability, and integrity of electronic health care records, that requires coordination within the healthcare enterprise. Thus, maintaining compliance of electronic records individually everywhere in the healthcare enterprise is costly and very difficult.

The issue of regulatory requirements is a big concern in the U.S. Of course, in Kuwait, we should have similar concerns and regulations. Compliance with such regulations requires a lot of effort and sometimes advocates who understand

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the law. Unfortunately, most of the regulations are targeting the entire medical records. Medical images are only small part of it.

Another reason to shift PACS to IT is storage requirements. Due to images stored there, PACS consumes a lot of storage capacity compared to other medical information systems.

Actually, new imaging technologies have become "STORAGE HUNGRY". For example, with multi-slice CT technology, a CT scan can consume between 1GB ~ 14 GB of data whereas the older CT technology consumes between 100 and 800 MB. Thus, safe storage can be so expensive especially when considering high availability and redundancy. Lastly, enterprise archive storage (data center) can help in meeting cost requirements and safety by combining all enterprise storage into one place (see [Calculating your PACS storage capacity](#)).

PACS through the CIO is an enterprise project, which could obtain more attention and financial support.

The reverse is seen in Kuwait. It appears evident that Kuwait spends more on imaging equipment and IT solutions compared to IT projects done through an IT department. So this statement is not relevant to Kuwait.

George Bowers pointed out that fears of Dr. Channin are understandable. Mr. Bowers agreed that radiology & hospital IT have different priorities. However, radiology IT is only one component of an enterprise and first priority should be given to delivering the efficient patient care.

I totally agree with this statement. Priorities may be different for both parties but these must be consolidated when possible. There is an aspect that health professionals can assess: patient safety! But that doesn't mean that the two parties (IT & medical staff) cannot layout the priorities together.

Mr. Bowers suggested embedding an IT team in each imaging department to gain domain expertise (individual department workflow) and to provide efficient service by through Service-Level-Agreement.

I totally agree with this suggestion as a transition point toward shifting PACS to IT. We will talk more about this later.

Dr. DAVID S. CHANNIN - Side B

Dr. Channin, representing those who oppose shifting imaging IT, posted many reasons to keep the imaging IT services (PACS administration) with imaging department itself.

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Dr. Channin argues that imaging IT is too complex and too valuable. Hospital IT people lack accountability in clinical applications and lack vision of how critical IT is in medical imaging.

This statement is true. Nevertheless, other supporting specialties in the hospital are in the same situation. For example, power, water supply, medical gases, infection control, nutrition and catering are all too complex and too valuable. Different bodies manage them all. Yes, there was a day when healthcare was basic and were one party performed multiple tasks. Radiology itself was previously part of physician's job or nuclear medicine was part of the radiologist's work.

Radiology produces much income to the hospital. Thus, a hospital cannot retain an inefficient operation and maintenance to compete in the market.

Imaging is one of the biggest service providers in the healthcare enterprise. Imaging services are growing rapidly and that's why they need an IT solution to help. Currently, PACS end-users are not happy with performance of their systems, especially when it comes to cost-effectiveness. Thus, radiology and other imaging specialties will need hands with them.

IT people prefer single vendor solutions & lower cost systems; while imaging service providers believe in customer satisfaction.

I've seen many radiologists who say they are fans of American versus German brands, or surgeons who say they are Calr-stores versus Aesculap fans. This is an attitude that must be overcome by setting evidence-based procurement policies. Tendering regulations should allow for procurement of good technologies within a given budget.

Administrating PACS requires in-depth knowledge in the medical imaging workflow.

Here is where a centralized IT system might fail if we push to it quickly. Healthcare IT people should work hand in hand with medical staff to learn basic things about workflow. Studying workflow is the key to a successful PACS implementation (see [CT Workflow in a PACS Environment](#)).

PACS is mission critical whereas other general IT systems are not. Thus, healthcare IT people cannot appreciate this.

Don't you think that IT in the finance world isn't critical? If healthcare IT is more critical to me and to you, I don't think that heads of the money empire agree

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with us. Yet, IT solutions in banks are run by IT people side by side to finance people.

Unlike HL7 standards, healthcare IT team has little or no experience in DICOM, which is the standard, used when dealing with medical images.

People can always learn! If IT people were able to learn HL7 then they will be able to learn DICOM. The committee of DICOM includes many people from IT background.

Radiology IT is rapidly evolving due to addition of new imaging technologies that require adoption of specialty standards such as DICOM & IHE.

Again, DICOM or IHE as standards are approachable by anyone. In fact, I believe that IT people can do a better job at this. The key is to understand basic technology and workflow.

Role of the CIO over IT is ultimate but, actually, strategic. Due to a wide range of IT solutions, the CIO is a leader who must have a role in executive decisions level. Dr. Channin says "...radiology understands the requirements and needs better than a centralized IT.

Absolutely. CIOs, CEOs, and CFOs cannot interfere in every detail of the business. They are supposed to lay out the overarching strategy and have people at lower managerial levels implement the plan. Moreover, the fact that radiologists know their requirements doesn't mean that they can run their IT solution better. Role of IT is to know their customers' needs and implement accordingly.

Dr. Channin goes beyond his position in refuting central IT and claims that radiology can help enterprise in setting standards and best practices. Role of CIO should be in providing guidance to monitor compliance to regulations. He concludes that role of central IT should be in management and service providing of IT infrastructure.

To some extent, I agree with Dr. Channin that radiologists took the lead in this field. During SIIM2009 I was amazed by the fact that radiologists were the pioneers of the DICOM standard and the ones who made this happen. I admire them for this. However, I think that things are getting more complex (specially with integration) and people are trying to find new architecture for future PACS systems.

Relevance to KHI

Stated above in RED color.

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Proposed solution: In my opinion, shifting imaging IT systems (PACS) to IT is a trend that will be evident in near future. However, as it is happening everywhere, such an evolution will require much time in Kuwait. Due to the association of PACS with the clinical environment, difficulties rise toward shifting PACS to IT. Thus, a intermediate position can be taken by dividing the responsibility between IT and the imaging departments especially with the fact that the MOH (public healthcare system in Kuwait) has a centralized management structure, which, usually, leads to huge centralized systems too.

We can give IT organizations the responsibility of IT infrastructure including networking, database administration, and storage. This is implemented in most medium-to-large size healthcare facilities and it is the standard in other imaging industries outside healthcare such as the petrochemical industry.