PACS Education Program

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Capstone Project

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Introduction

A member of the St. Joseph Health System of Orange, California, Covenant Health System (CHS) of Lubbock, Texas is the largest health care system in West Texas and Eastern New Mexico region. It consists of three main hospitals, Covenant Medical Center, Covenant Medical Center – Lakeside and Covenant Children's Hospital. These three facilities have a combined capacity of 1,338 beds. CHS is staffed by over 6,000 employees and has over 600 admitting physicians. CHS also has a number of affiliated and managed hospitals and clinics within the West Texas and Eastern New Mexico region. Last year, the administration of Covenant Health System decided to implement a picture archiving and communications system (PACS) at their main facilities. PACS is a computer hardware and software system that is designed to acquire, store and transmit and present digital radiographic images for interpretation and review. It is, in effect, 'filmless radiology'. All radiographic images, except mammograms, are acquired as digital data (virtual images), stored on a central server and made available on demand for viewing at computer workstations. At the workstations the images can be digitally manipulated in a number of ways in order to enhance their diagnostic value or to facilitate their viewing by the radiologist, clinician or nurse.

The hospital administration initiated the plan to acquire a PACS and chose Fuji (FUJIFILM Medical Systems, Stamford, CT) as the vendor of choice. A PACS Committee was formed and consisted of the Vice President in charge of Radiology, the two chief radiological technologists, hospital information systems (IS) personnel and four radiologists. The mission of the PACS Committee is to oversee the PACS installation, make recommendations to best serve the needs of the hospital and the clinicians and to educate the end users of the PACS. The end users consist of the radiologists, the admitting and staff physicians, the nurses, the radiology technical staff and the hospital ancillary staff who may need to use the system. The evolution (revolution?) from film based radiology to a filmless system involves a paradigm shift for everyone who uses radiographic images. For PACS to be successful, it is of paramount importance to have as smooth a transition as possible. To this end, the education of the end user is critical. I am a member of the PACS Committee and one of my duties is to be the point of contact for PACS education of physicians and nurses. Of the twenty-five radiologists on staff at CHS, only myself and one other have had experience using PACS in an actual work environment. To the best of my knowledge, only a few of

the over six hundred admitting physicians on staff have had personal experience with PACS and I would assume the same is true of the nursing staff.

The hospital ran an article about PACS in the recent issue of the Medical Staff Newsletter. This publication is distributed to the admitting physicians of the hospital. The hospital also ran a special PACS edition of the Covenant Connection, the newsletter that is distributed to the employees of the hospital. These articles announced the hospital's decision to implement PACS this fall and described the advantages of PACS over hard copy film radiology. The articles were primarily public relations type news pieces, important for making the physicians and staff aware of the hospital's decision to implement PACS. They do not go into detail about how PACS will function, the changes that we will have to make in how we view radiographic images, and they don't address questions that the end users might have about PACS. In meetings with clinicians I learned that there is a wide range of opinion about the transition to PACS. Some groups (e.g., the emergency room physicians) are very enthusiastic about the change. Most of them are computer literate and they look forward to the efficiencies that PACS promises, studies performed more rapidly, more rapid interpretation of radiographic images, more rapid reporting of radiographic findings, electronic communication with the radiologists via PACS, all resulting in faster diagnosis and treatment of patients in the emergency room. On the other hand, some groups that I spoke with are more divided in their opinions. The orthopaedic surgeons had views of PACS that ranged from highly enthusiastic to hostile. Many of them admitted to being computer illiterate and they were very resistant to having to learn how to operate a workstation in order to view their 'films'. The hospital Vice President in charge of radiology plans to meet one on one with physicians in their offices to explain PACS, but this will be a time consuming and inefficient method of educating the clinicians. It also doesn't address the needs of the other end users such as the nursing staff. Clearly, an educational module is needed that can be used to address large audiences of end users. To this end I have undertaken the task of developing a PACS education module using PowerPoint. I chose PowerPoint because it is a well recognized application for education, it is transportable, it is compatible with various operating systems (it is cross-platform), it permits modification of the content of the presentation with relative ease as new information becomes available, and can be tailored to meet the needs of various audiences. My presentation is designed to be presented in formal or semi-formal settings. In it, I will review the history of PACS, its advantages and disadvantages and the necessity of changing the way we work with radiographic images. I will

address the questions and issues of members of the audience and will provide them with a method (phone number and email address) by which they can have any other questions answered.

In the two weeks prior to PACS implementation Fuji will be conducting small group training sessions in the use of the PACS workstation for the benefit of the end users. My educational program will be presented to larger groups of end users prior to this and will bridge the gap between the public relations announcements about PACS and the small group training sessions.

The Presentation

The PowerPoint presentation that I have produced consists of six modules: (1) an introduction, (2) a discussion of the history of PACS, (3) a clinician module which includes a discussion of the advantages and disadvantages of PACS and the functions of the PACS workstation, (4) a workstation module that describes the functions of the workstation, (5) a radiological technologist module that discusses PACS for the point of view of the technologist, and (6) a technical module that discusses the technical considerations of PACS. There is some overlap in several of the discussions and because of this some slides are used in more than one module. The modules are designed to be used as stand alone presentations depending on the needs of the target audience. Each module, except the short introduction module, includes my name and email address as the final slide and audience members will be encouraged to contact me with if they have any questions or suggestions about the material.

The clinician module and the workstation module include an introduction to the workstation functions. These functions include magnification, zooming, changing contrast, rotating or flipping the image, annotating the image and sending messages electronically. They also discuss the way the user can define his or her preference for the way in which the images are oriented on the screen (hanging preferences). This will segue well into the vendor's small group training session where the workstation functions will be demonstrated and the end users will have the opportunity to call up and manipulate images on actual workstations.

Lessons learned

PACS is a hardware and software package that is being purchased by the hospital. It involves making and approving the decision at the highest level of hospital administration. It involves cost / benefit analysis, vendor selection, and massive changes in the infrastructure of the

hospital. This includes extensive site preparation, including making sure that the equipment in the department (fluoroscopic units, plain film units, ultrasound, computerized tomography (CT) units and MRI units) are capable of handling digital imaging and interfacing with the PACS server and workstations. Equipment that is not able to perform these tasks must be upgraded or replaced by suitable equipment. High bandwidth cables must be run throughout the facility in order to effect image transmission from the PACS server to the remote workstations. A large amount of computer hardware must be installed. For these tasks hospital employee manpower and budgets must be brought to bear. Therefore, a large part of the transition to PACS is controlled by the hospital.

Being primarily a clinical tool for image acquisition, storage, transmission, interpretation and review, a large part of the daily use of PACS is clinical. The radiologists, who will be using the PACS throughout their workday, must be able to advise the hospital on details that affect them. They must also communicate with the clinicians and other end users to get their input and to help the hospital to address their needs. The input of the end users is critical to the acceptance and success of PACS. The conversion to PACS must be a combined effort of both the hospital administration and the end users. Neither group alone can effect the change, and the needs of both groups must be acknowledged and addressed.

It is important to consider the timing of the announcement regarding the transition to PACS and the timing of the educational programs for the end users. If the transition is announced and the training takes place too early, say six months to one year before the transition is scheduled to occur, there may be a loss of interest among the end users and the training may be forgotten before the installation of the system. If the announcement is made too late, say one to two months before the installation, the end users may feel that they were left out of the decision making process and regard the implementation with hostility. It would seem that a two to three month lead time would be proper for the announcement of the change. This allows enough time for questions to be asked and issues to be addressed, and leaves enough time for minor changes to be made if necessary. The general educational programs can begin within a week or two of the announcement. The small group training sessions should be left till just before the ‘go live’ date so that the details of how the workstations function will still be fresh in the minds of the end users.

There is a lot of material to consider when discussing PACS. Different audiences have different needs. Rather than develop one presentation which would be too superficial and not address the specific needs of my anticipated target audiences, I came to the realization that the best

way to prepare this material was to create several presentations that can be used individually or combined, as needed, depending on the needs of the target audience.

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