Electronic Imaging System Implementation at Mayo Clinic Rochester: Downtime Procedures and Communication Plans

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Electronic imaging system implementation is a challenging process and requires: (1) thorough procedure documentation and communication plans; (2) systematic evaluation of processes by all involved personnel groups; and (3) anticipation of potential issues and documentation of new problems as they occur. Our department is continuously improving procedures and communications as opportunities arise. A downtime procedure manual and a basic communication plan has given us a foundation to build upon and will help us to maintain appropriate levels of patient care throughout electronic system failures.

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MAYO CLINIC Rochester is an academic institution, an integrated group practice, and a tertiary care medical center located in the Midwest United States. The campus consists of two hospitals (one a Level I Trauma Center), a large outpatient practice building, and two community medicine clinic buildings (Fig 1). The radiology department performed 800,000 examinations in 1998. Staff includes 80 radiologists, 10 physicists, 250 technologists, 50 registered nurses, and 300 support staff.

OVERVIEW

The Department of Diagnostic Radiology has taken a phased approach to electronic imaging:

- In the early 1990s an IBM AS/400 digital archive was developed in-house for storing magnetic resonance imaging (MRI) and computed tomography (CT) examinations.
- In 1995, the radiology information management system was introduced and by 1997 all radiology reports were available electronically to Mayo clinicians on their desktop computers.
- In 1996, computed radiography (CR) imaging was introduced in selected areas. Today mul-

tle areas have implemented CR: all intensive care portable examinations, all pediatric inpatient and outpatient examinations, the sports medicine clinic imaging, and examinations requested by five orthopedic surgeons.

- In 1997, the ultrasound and nuclear medicine sections installed mini-picture archiving and communication systems (PACS).
- In 1999, approximately 25% of the practice is digital with images stored in a digital archive.

As the digital images are sent to their respective archives, they are integrated with the electronic text report and are available to clinicians on their office desktop viewers. The department plan is to convert the remaining portion of the practice to digital imaging over the next few years.

OPERATIONAL ISSUES

In a large and geographically distributed practice, both communication and process documentation are essential for successful operation. In the world of paper, pencil, and film, patient identification and report changes can be made with a grease pencil and typewriter eraser tape. The electronic information and imaging systems create new challenges when part or all of the process malfunctions, such as:

- How do you notify people that there are system problems?
- What are your downtime procedures?
- How do you ensure that everyone knows what to do?
- How do you electronically reconcile changes when systems are up and running again?

We encountered these issues over the past couple of years and want to outline the process we developed for downtime procedures and communication plans.

DOWNTIME PROCEDURES

“What are your downtime procedures?”

“How do you insure everyone knows what to do?”

“How do you electronically reconcile changes when systems are up and running again?”

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Fig 1. Mayo Rochester Campus, 1999.

- Each imaging area is unique (outpatient, inpatient, CT, MRI, ultrasound, plain films, CR) and their downtime procedures and communication plans are documented and available for user reference.
- The radiology department function is highly integrated and requires multiple user input (desk attendants, x-ray records, radiographers, patient scheduling, transcription, and radiologists) to produce a downtime procedure manual. Users from each imaging section location worked through the downtime procedure details for that site.
- All of the imaging section downtime procedures are compiled and organized into a downtime procedure manual that is available in all imaging areas and reading rooms. This manual provides a common reference for all radiology employees and radiologists.
- Each area updates their own downtime procedures as changes occur and the entire manual is scheduled for update on a yearly basis.
- The Joint Commission on Accreditation of Hospital Organizations (JCAHO) requires competency in many areas such as information management. Imaging areas have annual competency evaluations that include aspects of these procedures. The downtime procedure manual becomes a reference for competency assessment and site visits.

COMMUNICATION PLANS

“How do you notify people that there are system problems?”

- An electronic “system status” document is available on all radiology computer workstations to update users of system performance problems and scheduled downtime events.
- Electronic mail is used to inform users, supervisors, radiologists, and Information Services personnel about problems, system updates, and any scheduled downtimes.
- There is a user telephone support line and on-call support.
- Radiology secretaries notify the on-call radiologists regarding last minute system issues.
- User support meetings are held to discuss system or support issues.
- Future communications will take into consideration a filmless environment.

SUMMARY

Electronic imaging system implementation is a challenging process and requires:

- thorough procedure documentation and communication plans
- systematic evaluation of processes by all involved personnel groups
- anticipation of potential issues and documentation of new problems as they occur

Our department is continuously improving procedures and communications as opportunities arise. A downtime procedure manual and a basic communication plan has given us a foundation to build upon and will help us to maintain appropriate levels of patient care throughout electronic system failures.