Agenda

• Introduction
• Historical Cycle of Radiology Coverage
• Challenges faced by radiology groups today
• Action plans to address revenue shortage
• Challenges faced with remote “Virtual” reading deployment today
• Requirements for future workflow to support seamless remote reading
• Review of case study
• Future planning for remote reading
Background

• Radiology Administration – 25 years
• Brookwood Medical
  – 185,000 studies
  – Full PACS deployment in 1995
• National Director of Customer Success for large PACS vendor
• Served on HIMSS intraoperability committee for 3 years and chaired committee in 2006
• Consultant with several PACS / RIS vendors in regards to product support for “Virtual” remote reading
• Involved with State of Alabama in support of IHE’s deployments
“I was going to wake up early to go jogging, but my toes voted against me 10 to 1.”
“What fits your busy schedule better, exercising one hour a day or being dead 24 hours a day?”
The Globalization of Radiology

Virtual remote coverage of radiology is occurring today and expanding rapidly. The medical community has accepted remote coverage as long as reports are timely and accurate. We will review some of the factors in the marketplace that are driving the rapid growth of remote reading. We will primarily focus on the challenges and impact this will have within the radiology community and in particular review the workflow implications to accommodate this model.
Future Radiology Virtual Coverage Cloud

As Google and other major software companies get involved with data movement between vendors some of the issues faced today will be reduced over time!
Changes in the Radiology Marketplace Today

- “Virtual” remote radiology coverage has become an acceptable practice in the marketplace today.
- With declining revenue due to DRA cuts radiology groups are searching for ways to offset declines in revenue by adding additional revenue sources.
- In some markets there are a shortage of radiologists that is creating a need for virtual coverage.
- Hospitals and medical staff are demanding that local radiology groups provide sub-specialty coverage (Neuro, MSK, Peds, etc.).
- Many smaller hospitals are contracting for total remote coverage (no radiologist on site).
- Many large teleradiology companies (Nighthawk, Virtual, USROC, etc.) are refocusing to provide Dayhawk final read coverage (primary target are current customers).
- Corporate hospital groups are exploring central read coverage for day and night coverage to enhance services at their hospitals and also they view as a potential revenue source.
Challenges that are faced today when a decision is made to implement “Virtual” remote reading coverage.
As radiology managers we have been charged to implement “Virtual” remote coverage for our facilities

Scenario that we face as a group today:

• A mega radiology group has contracted with corporate to take over coverage for our facilities. The group intends to provide on-site coverage but plans to use remote supplemental coverage to support the on-site radiologists. The new group anticipates that approximately 50% of the studies will be read at the remote site

• You have been chosen to serve on the task force to implement this project. We have 60 days to complete the project and to be fully operational

• All studies read at the central site will be final reads and must be supported with the same information as if the case is read on-site

• Facility expected TAT
  • STAT/ER – 30 minutes
  • Routine – 2 hours

• Radiologists at remote reading site will be scheduled for 10 hour shift and must read 120 – 150 cases per shift. It is essential that we design a seamless workflow between systems in order to support this volume

• Failure is not an option!!

• If the system fails, you will face a CLE! (Career limiting event)
Our first challenge is to identify the PACS systems that are in place at your facilities today. Please identify which systems you are using today!

- McKesson
- AGFA
- DR Systems
- GE – Centricity
- Philips – Stentor
- Siemens
- Emageon
- FUJI
- Other

**Vendors listed are only used as an illustration and do not reflect any type product endorsement.**
Now that we have identified the various PACS systems that are in place, we will also need to determine the various other systems that will potentially be impacted.

- RIS
- HIS
- Dictation system
  - Regular
  - Voice recognition
- Transcription
- Mammography Reporting System
- EHR
With the review of systems completed, we now need to discuss the project plan in order to complete the project within 60 days. How does the group recommend we proceed?

GET A GUN !!
Case Study – Radiology Group’s Implementation of “Virtual” Remote Reading
Review of radiology group’s effort to Implement Remote Reading Coverage

- Group of fifteen radiologists
- Approximately 250,000 studies
- Current breakdown of group coverage
  - Hospitals – 4
  - Mobile MRI’s - 2
  - Owned Imaging Center – 1
  - Other Imaging Centers – 2
  - Clinics – 10
  - Day coverage for teleradiology company - 1
- Driving force for change: Group has experienced a loss of 20%-30% revenue over the past two years with the largest impact at freestanding imaging center owned by the group
Systems in place at group’s facilities

- **Facility 1**
  - FUJI PACS
  - Powerscribe dictation
  - Meditech RIS

- **Facility 2**
  - GE Centricity PACS
  - Lanier dictation
  - GE Centricity RIS

- **Facility 3**
  - AGFA PACS
  - Lanier dictation
  - Cerner RIS
  - Cerner EHR

- **Facility 4**
  - Avreo PACS
  - Lanier dictation
  - Avreo RIS

- **Facility 5**
  - McKesson PACS
  - Powerscribe dictation
  - McKesson RIS

- **Telerad company**
  - Neurostar PACS
  - Onboard dictation with national transcription company

- **Imaging Center**
  - Avreo PACS
  - Dictation internal to Avreo
  - Avreo RIS

- **Future sites**
  - Various PACS and RIS vendors
Current challenges with remote (final read) coverage

- Working with disparate PACS / RIS vendors to establish DICOM query / retrieve can be problem prone, very slow, and expensive.
- There will be push back to not allow a 3rd party query to the facility archive.
- Each vendor will have their own way that they would like to accomplish the project and are not very willing to step up to the plate in leading the integration across vendors.
- Many PACS / RIS vendors are not very eager to take the lead to deploy a consolidated worklist that spans multiple vendors. Some have difficulty in accomplishing consolidated worklist with their own product across multiple sites.
- Not all layers of DICOM are supported by all vendors. Some information will be proprietary and difficult to deal with. Scanned documents will present challenges when transferred.
- Mechanics of using multiple systems at the same time with different user interfaces and logins presents numerous issues and is more problem prone for errors.
- Monitoring numerous systems for “STAT” and “ER” cases at the same time are cumbersome.
• Pre-fetching prior studies and reports from 3rd party PACS / RIS is very difficult and expensive. When this is completed the primary PACS must recognize the exams as priors

• Orders and other scanned documents are not compatible at the central read site in many cases. In many situations the documents are in a proprietary format that cannot be viewed in central PACS

• Some required information is not available in the DiCom header and many vendors do not support a process that will allow information to be added (patient location - ER, ICU, etc.)

• Some PACS systems do not pre-cache to remote reading station which cause delayed read times that are unacceptable
With the review of some of the challenges faced today, let’s now turn our attention to the future requirements for seamless integration for Remote Reading.
Specific requirements for remote reading system

- Consolidate single worklist to manage workflow from all PACS vendors (project will not be successful with multiple workstations deployed)
- All facility PACS / RIS must be seamlessly integrated to the remote read PACS / RIS
- Process should be paperless. The information required by a radiologist reading remotely will be the same as an on-site radiologist and should be electronic
  - Relevant priors
  - Prior reports
  - Current order
  - Other on-site worksheets
- Facility PACS must support DiCom query / retrieve and the organization must be agreeable to allow the query
- Facility RIS must allow query of full exam history along with prior reports
- Ability to add additional information that may not be available in the standard DiCom header that is passed
  - Location of patient (ER, 2N, ICU) in order to electronically distribute copy of report
  - Study priority must pass (STAT, Urgent, Routine) in order to prioritize worklist
Requirements for remote reading – Cont.

- Central read system must support the ability for data to be segregated by facility in order to meet all security HIPAA requirements. (Staff at each facility should only have access to data from their facility)

- Central system must support ability to update study status in the facility PACS / RIS

- System should support ability for electronically data distribution with capability for immediate feedback to ER

- Study storage at central site will be 60-90 days with originating facility having responsibility for legal storage of record

- Radiologists at the remote reading site is targeted to read 120 – 150 cases per 10 hour shift
Future Requirements for Remote Read Workflow Model
View of Consolidated PACS Worklist

Study Date | Stat | DOB | Patient No. | Description | Mod | Status | Ordering Physician | S... | Inst... | Institution | Linked
--- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | ---
03/15/2008 10:19 | 09/12/1946 | GRD0371H11317 | NM MYOCARDIAL SP... | NM | UPDATED | PRICHARD^MA... | 2 | 9 | Gordon Hospital | Linked
03/15/2008 09:59 | 12/22/1963 | MMC08096 | HEAD | CT | DICTATED | ELBASHA | 2 | 71 | Murray Medical Center | Linked
03/15/2008 04:51 | 06/19/1932 | MMC02020 | HEAD | CT | DICTATED | ELBASHA | 1 | 75 | Murray Medical Center | Linked
03/14/2008 23:52 | 05/02/1994 | GRD0371H76771 | XR FINGERS MIN 2 V LT | CR | UPDATED | HELM^LYLE^F | 2 | 2 | Gordon Hospital | Linked
03/14/2008 23:19 | 03/14/2008 | GRD0371H00445 | XR CHEST 1V | CR | UPDATED | SCOTT^JAMES^J | 1 | 2 | Gordon Hospital | Linked
03/14/2008 22:37 | 05/18/1961 | MMC09207 | HEAD | CT | DICTATED | ELBASHA | 1 | 75 | Murray Medical Center | Linked
03/14/2008 22:27 | 05/02/1994 | GRD0371H76771 | XR FINGERS MIN 2 V LT | CR | UPDATED | HELM^LYLE^F | 2 | 2 | Gordon Hospital | Linked
03/14/2008 21:36 | 05/02/1994 | GRD0371H00445 | XR CHEST 1V | CR | UPDATED | SCOTT^JAMES^J | 1 | 2 | Gordon Hospital | Linked
03/14/2008 21:20 | 01/25/1971 | GRD0371H3686 | CT ANGIO CHEST | CT | UPDATED | KING^STEPHEN^ | 3 | | Gordon Hospital | Linked
03/14/2008 20:39 | 03/20/1935 | MMC09737 | HEAD | CT | DICTATED | ELBASHA | 1 | 75 | Murray Medical Center | Linked
03/14/2008 19:49 | 06/26/1966 | GRD0371H9655 | CT ABDOMEN W CO... | CR | UPDATED | CAPTAIN^ANT... | 3 | 2 | Gordon Hospital | Linked
03/14/2008 19:25 | 01/25/1971 | GRD0371H3686 | XR CHEST 1V | CR | UPDATED | KING^STEPHEN^ | 2 | 2 | Gordon Hospital | Linked
03/14/2008 19:25 | 10/03/1957 | GRD0371H7376 | XR CHEST 1V | CR | UPDATED | PRICHARD^MA... | 2 | 2 | Gordon Hospital | Linked
03/14/2008 18:34 | 10/23/2003 | GRD0371H25761 | CT HEAD/BRAIN WO... | CT | UPDATED | STEARNS^JOH... | 1 | 74 | Gordon Hospital | Linked
03/14/2008 17:47 | 06/24/1944 | GRD0371H2990 | XR CHEST 1V | CR | UPDATED | CAPTAIN^ANT... | 3 | 3 | Gordon Hospital | Linked
03/14/2008 17:45 | 02/01/1957 | GRD0371H9917 | MR ANGIO ABDOME... | MR | UPDATED | PRICHARD^MA... | 1 | 3 | Gordon Hospital | Linked
03/14/2008 16:57 | 11/29/1976 | GRD0371H99391 | CT ABDOMEN W CO... | CT | UPDATED | STEARNS^JOH... | 2 | | Gordon Hospital | Linked
03/14/2008 16:54 | 12/02/1964 | 029478 | Neck, Soft tissue neck | CR | DICTATED | GILBERT, SAMUEL | 2 | 2 | Marietta Imaging | Linked
03/14/2008 16:47 | 11/27/1969 | AFM14754 | KUB | CR | STARTED | KUZIO | 1 | 1 | Acworth | Linked
03/14/2008 16:41 | 06/20/1968 | AFM14750 | CXR | CR | DICTATED | KUZIO | 1 | 2 | Acworth | Linked
03/14/2008 16:39 | 11/20/1953 | MMC09300 | ABD WITH | CT | DICTATED | BIDULC | 2 | | Murray Medical Center | Linked
03/14/2008 16:39 | 03/31/1994 | 95140 | CHEST, 2 View | CT | DICTATED | WHITE, Horace | 1 | 2 | Marietta Imaging | Linked
03/14/2008 16:36 | 10/03/1957 | GRD0371H7376 | MR BRAIN WO CONT | MR | UPDATED | PRICHARD^MA... | 2 | | Gordon Hospital | Linked
03/14/2008 16:22 | 05/08/2003 | GRD0371H12080 | CT ABDOMEN W CO... | CT | UPDATED | BROWN^CVNT... | 1 | 1 | Gordon Hospital | Linked
03/14/2008 16:18 | 11/25/1952 | 024363 | Unilateral Venous Do... | US | DICTATED | RAVIKANTH, A... | 9 | 27 | Marietta Imaging | Linked
03/14/2008 16:18 | 01/24/1962 | GRD0371H09433 | XR ABDOMEN AP | CR | UPDATED | KIM^SUSAN^I... | 1 | 4 | Gordon Hospital | Linked
03/14/2008 16:08 | 10/03/1968 | AFM09693 | CXR | CR | UPDATED | KUZIO | 1 | 2 | Acworth | Linked
03/14/2008 16:06 | 12/06/1988 | GRD037H99999 | XR FOREARM 2V RT | CR | UPDATED | STEARNS^JOH... | 2 | 3 | Gordon Hospital | Linked
03/14/2008 16:05 | 12/06/1988 | GRD037H99999 | XR WRIST MIN 3V RT | CR | UPDATED | STEARNS^JOH... | 2 | | Gordon Hospital | Linked
03/14/2008 16:04 | 03/12/1948 | 95138 | CHEST, 2 View | CR | DICTATED | WHITE, Horace | 1 | 2 | Marietta Imaging | Linked
03/14/2008 16:02 | 07/25/1983 | GRD0371H45051 | XR FOOT MIN 3V LT | CR | UPDATED | STEARNS^JOH... | 1 | 4 | Gordon Hospital | Linked
03/14/2008 16:00 | 09/12/1985 | 82774 | US Breast Unilateral | US | DICTATED | GODFREY, WILLIAM | 2 | 5 | Marietta Imaging | Linked
03/14/2008 15:58 | 11/25/1952 | 024363 | Leg, Tib, Fb | CR | FINAL | RAVIKANTH, A... | 7 | 2 | Marietta Imaging | Linked
03/14/2008 15:58 | 12/05/1971 | MMC104590 | CT ABD CT THORAX | CT | DICTATED | BIDULC | 1 | 2 | Murray Medical Center | Linked
03/14/2008 15:54 | 11/25/1952 | 024363 | Knee, LT | CR | FINAL | RAVIKANTH, A... | 7 | 3 | Marietta Imaging | Linked
03/14/2008 15:52 | 06/16/1962 | AFM13785 | CXR | CR | UPDATED | DR. KUZIO | 1 | 2 | Acworth | Linked
03/14/2008 15:46 | 04/01/1961 | AFM17363 | r SHOULDER | CR | UPDATED | KUZIO | 1 | 2 | Acworth | Linked
03/14/2008 15:46 | 06/20/1961 | 029485 | IR Breast Unilateral | US | DICTATED | CLIFFORD, DAVID | 27 | | Marietta Imaging | Linked
**Recommended workflow to consider for future remote read site deployment**

- Deploy DiCom gateway / router at each site to be the traffic cop between the remote and central site. A direct DiCom send may be possible but typically the study will require some interaction by the onsite staff before sending.

- The gateway will serve as the vehicle for DiCom image transfer as well as HL7 orders from RIS.

- Once the current order has been received the on-site gateway will initiate a full query of the radiology exam history from the on-site RIS.

- Upon transfer of full exam history the gateway will initiate a DiCom retrieve of relevant prior images along with an HL7 retrieval of relevant prior reports.

- The current study along with scanned documents will be forwarded to gateway.

- The study will hold at gateway for staff to verify and confirm that all information is present and accurate. Once confirmed, this initiates a transfer of information to remote read RIS / PACS.

- The exam will be dictated with report creation in central RIS (VR deployment as soon as feasible).

- Upon authentication in central RIS, the report will transfer to the on-site RIS via HL7.

- The on-site RIS report status will be updated upon receipt of final report. The on-site RIS will update the study status in PACS to final.
Conclusion

- The **globalization of radiology is occurring today** with the establishment of “Virtual” Remote reading sites
- Numerous national teleradiology groups are adding Dayhawk final read services. If your current radiology group is using one of the large teleradiology companies you will probably be introduced to this concept very soon
- Local radiology groups are expanding to provide Day and Nighthawk coverage to offset reimbursement loss due to DRA
- Large corporate chains are exploring providing supplemental and night coverage centrally
- PAC and RIS systems are lagging in workflow to support remote final reads. Many vendors indicate they provide the full solution but do not
- Numerous challenges exist with state licensure and facility credentialing when final remote reads are proposed (this will change in time)
- Over the next ten (10) years a large percentage of radiology coverage will be provided remotely
- Any organizations consider the initial or replacement purchase of PACS should ensure the support of remote reading on a 3rd party PACS

** Radiology groups are one of the primary driving forces with implementing this model
With the changes coming with remote radiology coverage, will you be ready?

Questions??

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