Curriculum in Radiology Reporting: An Interactive Web-Based Educational and Assessment Program in Communication Essentials

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THE RADIOLOGY ROUND TRIP

• Clinician orders appropriate test and conveys relevant clinical information to radiologist
• Exam successfully performed
• Images interpreted correctly
• Report properly composed
• Report transmitted in manner that is relevant to its content
• Report received by responsible clinician intact and on time
• Medical relevance to the patient of report content is understood by the clinician and acted upon
IDEAL PROCESS

• Ordering and scheduling
  – Appropriateness determined by clinical indications BEFORE scheduling

• Procedure
  – Indication specific protocols for each modality and body region

• Interpretation
  – Standardized reports for each combination of modality, body region, and clinical indication

• Review of results and clinical decision making

• QC/QA and research using database of indications, procedures, and results
FUTURE POSSIBILITIES

• Centralized repository of report guidelines
  – Evidence-based
  – Quantitative where appropriate
  – Authoritative
  – Up-to-date
  – Widely available over Internet
  – Incorporated into production environment in decision support role
HOW DOES IT REALLY GO?

• I would guess that a minority of examinations could be said to formally fulfill all of the preceding steps in the ‘round trip’

• So as not to alarm you, I would also guess that the vast majority of omissions or errors in the process are corrected through personal interactions between physicians and/or their patients
CURRENT STATUS OF RADIOLOGY REPORTING

• Most radiologists still rely on non-standard free-text reports transcribed by humans for all but a few examinations (e.g. mammography)
• This is changing rapidly due to speech recognition and increasing expense of human transcription
• Generally, referring clinician satisfaction with radiology reports is at best lukewarm
CONSUMER’S OPINIONS

• Referring physician opinions about radiology report content and structure in 3 published surveys
  – Want reports to be **complete** including pertinent negatives
  – Want reports to be in **consistent formats**
  – Feel that reports in their institutions fall far short of these goals
  – These studies are all rather dated (5-15 years old) but the results are still valid today
WHY IMPROVE REPORTING?

• A formal interpretative report is the diagnostic radiologist’s work product …It is the sum and substance of what we do

• More consistent, accurate, and complete reports should lead to
  – Reduced error and improved outcomes
  – Increased process efficiency
  – Decreased duplication and cost
WHY IMPROVE REPORTING?

- Radiologists must add value to the process of imaging and the report is the one sure way to do this
- Radiologists can no longer blithely assume sole ownership of imaging in their institutions
- Other medical disciplines that use imaging make extensive use of structure in their reporting
FRAMEWORK FOR IMPROVEMENT

• Standardized language
• Structured format
• Consistent content
• Realized through changing processes
  – Ordering
  – Production
  – Storage
  – Distribution
  – Review
WAYS TO IMPROVE REPORTING

• Structured reporting
  – Currently a ‘hot’ topic in radiology
  – Lots of commercial effort aimed at selling software
  – Standardization-BIRADS, RadLex

• Very little basic research
  – Most efficient format/structure
    What do clinicians/patients want?
  – What do clinicians/patients need?
WAYS TO IMPROVE REPORTING

- Teaching radiologists how to report
- Surely, since reports are the radiologists work product, residencies teach this skill explicitly and evaluate competence in their trainees, right?
- Well, not really, I am embarrassed to say!
TEACHING REPORTING

- Recently completed survey
  - 159/193 U.S. radiology programs
- Used web based platform to conduct
- 86% devote 1 hour/year or less to didactic instruction about reporting
- 80% formally evaluate <1% of resident reports
- 60% do not require their residents to use specific templates for reports
MORE MOTIVATION FOR TEACHING

• ACGME requirements for teaching ‘non interpretive’ skills in residency
  – These include reporting and communication of results

• For 3rd party reimbursement, reports must contain appropriate language to support medical necessity
  – Increasing need for physician knowledge about coding (ICD-9/CPT)
OUR PROPOSAL

• Develop framework for web based teaching of radiology reporting
  – Case based instruction
  – Include self assessment tools
  – Build web based authoring and administration system

• Write 3-4 modules
  – Introduction
  – Concept of key findings
  – Radiology triage (urgency of key findings)
  – Components of report
THE GRANT PROGRAM

• Radiology Society of North America
• Annual WWW based teaching grant
• 75K initial year of funding
• Extension to 2nd year
• 1 award per yearly application cycle
• We were awarded the grant for 2003-2004
• We were granted an extension for 2004-2005
PEDAGOGY

• We are constructing the modules using the "tripod" of tutorial, reference and self-assessment.

• Build to simulate a radiology case as it would be seen by a practitioner
  – Request for examination
  – Images from that examination
  – Prior studies
  – Interpretative report for current examination
PEDAGOGY

- All cases require student to identify the **key imaging** findings
- All cases require the student to give a **clinical urgency** to these key findings
- Variable number of additional steps at discretion of authors
  - Self assessment questions
  - Feedback for questions
  - Didactic steps
PEDAGOGY

• The majority of teaching is via critical analysis of reports accompanying each case
• Recall Goofus and Gallant from *Highlights*
• Some reports are exemplars of good communication
• Other reports are object lessons about how NOT to communicate
DESIGN CONSIDERATIONS

• The request, images, and report are always displayed at top and left
• Self assessment steps, feedback, and didactic steps displayed in sequence to the right
• Authors can highlight text in the steps on the right AND in the request or report
• These highlights can change dynamically to emphasize different points
DESIGN CONSIDERATIONS

• Wanted to keep the system very generic so that it could be used for other purposes
• For example, instead of teaching radiologists how to construct reports, could teach clinicians how to READ reports
• Same case based paradigm but activities not directed at critique of the report but and understanding the clinical relevance of what is said
TECHNICAL CONSIDERATIONS

• Opted to use PHP and MySQL for development and delivery
• Will host the service on open source platform
  – Unix / Linux
  – Apache Server
• Considered using advanced web technology like Flash or Cold Fusion
• Opted for ‘plain vanilla’ HTML with JavaScript where needed
OUR PROCESS

• Designed database in MS Access
• Build prototype authoring system in MS Access
• Added several complete test cases to the database
• Transferred database to MySQL and built web based student views of cases
• Are now building web based authoring and administrative functions
ABOUT PRIVACY

• Even without HIPAA, we are ethically bound to not reveal real patient’s health information

• In the following demonstrations, you will see names of patients and doctors as well as ages and dates of examinations

• These demographics are ALL fictitious

• Also, the text of ALL example reports was written by us and not taken from clinical charts