

# 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 3<sup>rd</sup> 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 2<sup>nd</sup> 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

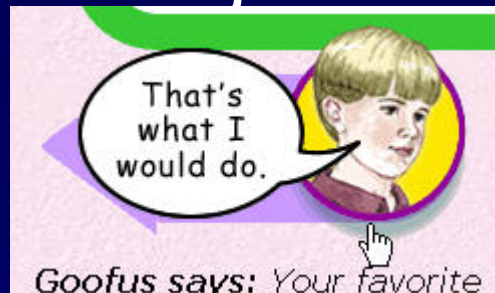
- All cases require student to identify the **key imaging** findings
- All cases require the student to give a **clinical urgency** to these key findings
- Variable number of additional steps at discretion of authors
  - Self assessment questions
  - Feedback for questions
  - Didactic steps

# 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