Using Addendums to Assess Minimum Event Rate in a Radiology Practice
Authors:

- Mohammad Mansouri
- Leeann Brigham
- Khalid Shaqdan
- Hani Abujudeh

We have no conflicts of interest to disclose

1 Massachusetts General Hospital, Boston, MA
Goals and Objectives

- Demonstrate the feasibility of using report addenda to study errors in diagnostic radiology
- Present preliminary data on the rate of error types and the distribution of error by image modality at large medical center
- Target audience: radiology learners
Diagnostic errors in radiology occur 3-4% of the time in daily practice, and up to 30% of the time when an abnormality is present [1].

Among other negative consequences, errors can cause significant delays in diagnosis [2-3].

Studies to date have focused on errors occurring in difficult cases, which have higher error rates but may not be representative of the errors occurring in hospitals on a daily basis [3-5].

At our institution, an addendum can be added by the author of the original report to correct an error; therefore, tracking addenda may allow for analysis of errors that occur in daily practice.

PURPOSE

- Can we use addenda to diagnostic radiology reports to study errors that occur on a daily basis?
- Can we calculate overall error rate and classify error types with studying addenda?

METHODS

- This is a HIPAA compliant, IRB approved study. Informed consent was waived.
- Radiology reports with addenda compiled across all departments (April-May 2014, N = 851)
- Based on addenda text, each report classified into 5 major error categories
  - Under-reading
  - Over-reading
  - Poor communication
  - Insufficient history
  - Poor technique
- Error rates calculated by error type and imaging modality
Classification System Overview

- Errors in addenda were classified into 5 major categories
- Each major category was further divided into subtypes

1. **Under-Reading**
   - Location
   - Satisfaction of Search
   - Over-reliance on prior exam
   - Incomplete description
   - Did not read all images

2. **Over-Reading**
   - Faulty interpretation
   - Limited differential
   - Normal variant

3. **Poor Communication**
   - Typographical error
   - Erroneous report
   - Missing or erroneous follow-up recommendations
   - Missing or erroneous technique details

4. **Insufficient History**
   - Clinical history
   - Previous exam

5. **Poor Technique**
   - Limited views
   - Artifact-related
Results

- Percentages of major error types in addended reports (N=851).

- Error rates by type of error classification. Each rate is per 1,000 examination in the same 2-month interval. Overall error rate is calculated over a 1-year period.
Results

- Subtype breakdowns for errors of under-reading, over-reading, incomplete history, and poor technique

- Among communication errors, the most common subtype was erroneous technique (32%) followed by typographical errors (20%) and physician communication (16%)
Results

- Error rates by imaging modality. Note that the Radiography category includes mammography. Each rate is depicted per 1,000 studies performed within the respective modality performed over the same 2-month interval. Overall error rate, is calculated over a 1-year period.

- Frequency of error types by imaging modality. For each imaging modality, the frequencies of different error types are shown for the 851 addenda categorized. Note that the radiography category includes mammography.
Marking errors by addenda is the tip of the iceberg.

Error rates from addenda are probably underestimated as we can only count errors we are aware of.

Peer-review, can identify uncorrected errors that have not yet been identified.

The complementary use of both approaches would be a powerful approach to refining our understanding of error frequency.

Radiologists are required to expedite delivery of an emergent imaging finding to the ordering physician and document that communication.

The prevalence of communication errors in our study means that radiologists are catching and correcting them in report addenda, which may reflect a greater vigilance for effective communication of findings to clinicians.
STUDY CONCLUSIONS

- Analysis of addenda to radiology reports is a feasible novel approach for study of errors, and would be reproducible at possibly all institutions.
- Diagnostic studies at our hospital had a 0.8% error rate.
- Error rates differ widely by modality, with three dimensional techniques being most prone to error.
- In errors of addenda poor communication is the most frequent type, suggesting a clear area for intervention.

PLANNED FUTURE ANALYSES

- Validation of classification system for inter- and intra-rater reliability.
- Relationships between errors and other variables:
  - Time of day, day of week
  - Patient sex
  - Radiologist level of training

Author Contact Information:
Mohammad Mansouri, MD
Postdoctoral Research Fellow
Massachusetts General Hospital
mmansouri1@mgh.harvard.edu

Hani Abujudeh, MD
Associate Professor of Radiology
Massachusetts General Hospital
Abujudeh.Hani@mgh.harvard.edu