A comprehensive approach to convert a radiology department from ICD-9-based coding to ICD-10-based coding

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Problem

- The International Classification of Diseases ninth revision code set (ICD-9) will be replaced by the tenth revision (ICD-10) code set in the United States on October 1, 2015 [1]
- ICD-10 increases the specificity of coding and expands the total number of codes from ~13,000 to >60,000 [2]
- The transition to ICD-10 will affect every medical practice in the US [3], and will cost between $425 and $1150 million [4]
- Radiology practices have unique challenges that must be overcome in order to code their studies accurately

Specific Aim

- The goal of this project was to improve radiology reports to ease the transition from ICD-9 to ICD-10 and to improve coding for ICD-10

Methods

Environment

- This improvement project took place in a large academic pediatric radiology practice
- All radiology reports are dictated using speech recognition software (PowerScribe 360, version 2.0; Nuance, Burlington, MA).
  - 100% standard, structured reports
  - Structured report is prepopulated into the dictation window when the study is opened
- Reports are coded using an computer-assisted coding system (CodeRyte; 3M, Saint Paul, MN)

Risk Assessment

- All final radiology reports dictated over a three month time period by ten different radiologists within the department were assessed using an experimental ICD-10 automated coding engine (CodeRyte, 3M).
- The total percentage of reports that generated an unspecified ICD-10 code was determined, and two high-risk areas were identified: insufficient clinical history and insufficient detail in fracture radiographs

Improving Technologist History (Who-What-When-Where)

- Many of the components required for proper coding in radiology come from the clinical history provided by the ordering provider
  - Often incomplete
  - Does not always include all the necessary entities for the increased specificity of ICD-10 [2, 5, 6]
- In order to improve histories, we asked all of our technologists to obtain information directly from the patients and families. This work expanded upon an earlier project focused in radiography [7]
- Technologists were educated on the four components of a complete clinical history.
  - **Who** is providing the history?
  - **What** happened?
  - **Where** does it hurt?
  - **When** did it happen?

Methods

Improving Technologist History (Who-What-When-Where)

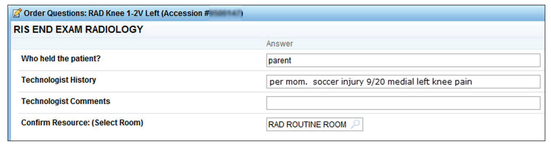

Figure 1: The technologist's enter their history as an end exam question

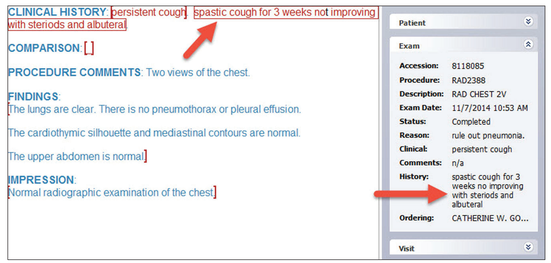

Figure 2: Screen capture from voice dictation system shows the technologist history automatically populated within the radiology report (upper arrow). The history is also in the exam notes section (lower arrow)

- In June, 2014, a technologist history field was added as an end exam question in the radiology information system *(Figure 1)* (Epic Radiant, Verona, WI)
  - Mapped to dictation system so that the technologist history is automatically populated in every report *(Figure 2)*
- Technologist histories were randomly audited
  - 200 histories audited per month per modality
  - Defined as a group performance goal for all technologists with a goal of 95% of all studies containing a complete history
  - Technologists are given routine feedback after the monthly audit and from radiologists

Modifying Structured Reports

- A subgroup of clinical section and informatics leaders was created to evaluate and modify the structured reports [8] for extremity radiographs
- An online ICD-10 codebook (www.icd10data.com) was used to ensure that the required information was obtained for accurate ICD-10 coding
- The subgroup created four potential reports for use within the department ranging in complexity and structured content
- Each structured report option was then to be tested with two separate body parts, one simple (i.e. femur) and one complex (i.e. hand)
- Reports were then to be run through an automated ICD-10 coding engine and the percentage of unspecified reports was to be compared between reports
- Radiologists were also to be surveyed regarding their overall preference on report type and ease of use

Results

Risk Assessment

- A total of 12,077 reports were analyzed
- 43% (5151/12077) of reports were coded with an unspecified code
  - 62% (3197/5151) of deficient reports were extremity radiographs
- The automated coding software algorithm was found to be insufficient
  - Studies deemed to be deficient often had complete information
    - Vendor only coded "Clinical History" and "Impression"
    - Vendor delays in providing an updated ICD-10 algorithm prevented further modification and evaluation of reports

Improving Technologist History

- At baseline, technologists obtained a complete history for 57.8% of studies performed in the department
- By October, 2014, technologists in all modalities were providing a complete history more than 95% of the time *(Figures 3, 4)*

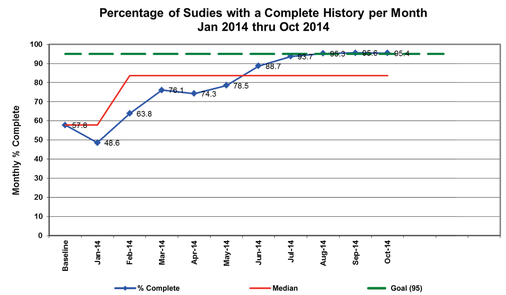

Figure 3: Run chart shows that the overall percentage of studies in which the technologists have obtained a complete history has improved from a baseline of 57.8% to a current median of 88.7%

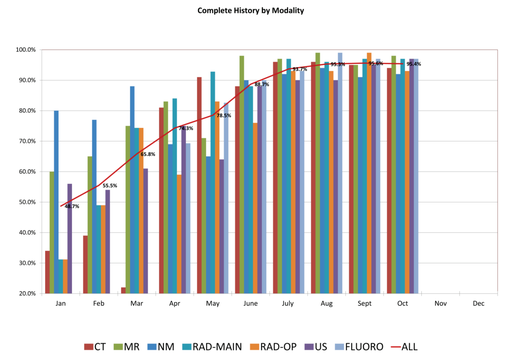

Figure 4: Bar chart shows the percentage of studies with a documented complete history per modality per month; the line shows the overall performance of the entire department

Results

Modifying Structured Reports

- Based on the risk analysis, extremity radiographs were deemed to be the most at risk, so these were the structured reports that were most heavily edited.
- For each modified extremity radiograph report, the radiologist will now be asked to report on a series of findings relating to fractures such as the location and type of fracture, the presence of physeal involvement or displacement, and the presence of healing [9]
- Several potential reports were created with varying level of structure *(Figure 5)*.
- Further analysis could not be performed due to the delay in obtaining an acceptable automated ICD-10 coding system.

Figure 5: Figures shows sample structured reports for a radiograph of the ankle. The reports change with increasing structure from a) through d)

Conclusions

- Quality improvement techniques can be used to ease the transition to ICD-10 in a radiology department
- Technologists can supplement the provided clinical history in a radiology department obtaining a complete Who-What-When-Where clinical history more than 95% of the time
- The use of standardized, structured reports allowed us to identify deficiencies in an automated coding system

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