Integra
Imaging

Excellence in Transcription Accuracy: Using Quality Improvement to Tame Voice-Recognition Errors with Radiologists as Editors

F.A. Mann, MD[1]; QAC Chair
Sara K. Miller[2]; Operational Excellence Director
Gordon Keel[2], MD
J S Brower[2], MD; President
L Armiger[2]; Corporate Compliance Officer
S M Russell[2]; COO
S Duvoisin[2]; CEO
[1]Seattle, WA
[2]Spokane, WA

NB: No extramural funding
CONTACT: fmann@searad.com

ABSTRACT

PURPOSE: Re-establish transcription error-free diagnostic radiology reports historically obtained using transcriptionists with a web-based computerized continuous speech (voice) recognition program [VR] with editing performed real time by dictating radiologists.

METHODS: Beginning in 2009 (baseline), we have had a Quality Assurance Editor [QAE] review 30 reports per month per radiologist in our Eastern Division. The QAE, using a standard data extraction form, classified each report as error-free or not, and calculated the error-free rate. Our Western Division continued to use routine random peer-review feedback, supplemented by regular audits (~10 examinations per radiologist). Data was entered by report institution of origin, accession number, and radiologist into a MySQL database (Oracle, Redwood, CA). Data exported to Excel (Microsoft Corporation, Redmond WA) for analyses: mean, median, minimum, maximum, & skew by radiologist by year. As part of root cause analysis, transcription errors were classified using modified Regenstreif VR error classes: (1) Annunciation; (2) Dictionary absence; (3) Suffix (wrong tense); (4) Added words; (5) Missing words; (6) Homonyms; (7) Spelling; (8) Unclassifiable based on context; and, (9) Critical errors, in which reader might confuse meaning of report. Summary and case-specific data were used to assess human-system integration using the Hobb model: (1) Tasks compatible with human capabilities and characteristics (dictating and editing); (2) System design and implementation capable of eliminating or reducing human error; and, (3) System implementation made to take advantage of unique human capabilities. Per report program costs were calculated.

Integra Imaging

ABSTRACT

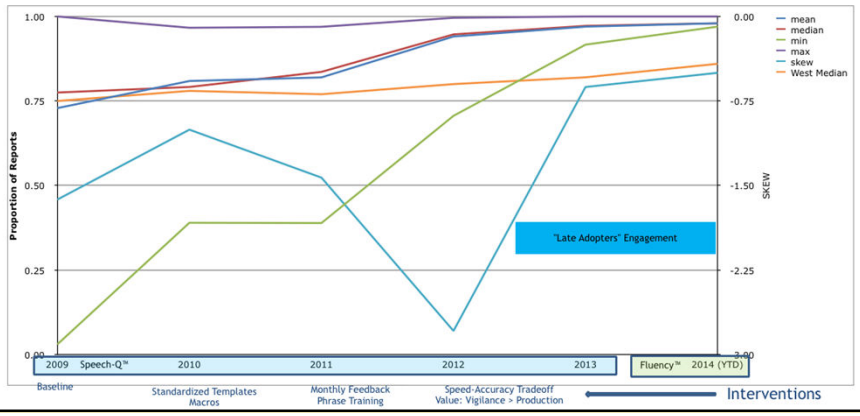
RESULTS: The number of reports scored by the QAE for years 2009-2013 was: 8500, 9246, 17886, 17946, and 19699, for a total of 73277. Comparing baseline and follow-up analyses, system design and implementation contributed to most of VR transcription errors, although individual radiologists showed significant differential performance. Approximately 20% of radiologists were “”late adopterss (eg, serially in bottom decile for error-free report proportions). Negative skew reflects the wide variance in proportion of error-free reports between these “late adopters” and the balance of the group, and changes in skew over time show initial narrowing of variance in the “adopting” radiologists towards higher proportions of error-free reports, and convergence as late adopters performance caught-up. The implemented interventions include: (1) Introduction of standardized report templates and subroutine macros; (2) Monthly feedback to individual radiologists containing anonymized histograms showing their error-free report percentage relative to peers, and specific transcription errors receiving addendum to original reports; (3) System dictionary and radiologist phrase training, as part of enhanced user education; and, (4) Both group leadership and peer-to-peer encouragement for all radiologists to be vigilant in reducing transcription errors (eg, “Good radiologists do not sign bad reports.”). The combination of system design and radiologist education initiatives resulted in substantive improvements in word error rates, and in proportion of transcription error-free radiology reports: 2009 2010 2011 2012 2013 Mean 0.73 0.81 0.82 0.94 0.97 Median 0.78 0.79 0.84 0.95 0.97 Minimum 0.03 0.39 0.39 0.71 0.92 Maximum 1.00 0.97 0.97 1.00 1.00 Skew -1.62 -1.00 -1.43 -2.79 -0.63 Only a small change proportion of error-free reports from baseline data was appreciated in the Western Division (median 2009-2013: 0.75, 0.78, 0.77, 0.80, and 0.82). The program costs varied with total volume between $0.04 and $0.09 per examination performed.

Integra Imaging

ABSTRACT

CONCLUSION: Using data-driven system design changes and (non-punitive) radiologist education, considerable improvements in transcription quality can be achieved without sacrifices in radiologists' productivity.

Radiologists Edited Voice Recognition Transcription Error-Free Reports
Eastern Division (Intervention) *vs.* Western Division (Control)



Integra Imaging

INTRODUCTION: The "Good"

- Background
  - Rapid dissemination of computer-based continuous speech recognition technology (CSR)
    - Driven by potentials for reduced report turnaround times (RTAT) & costs
      - RTAT reductions: 100-2400%
      - Transcription cost reductions ("Front End" implementation):
        - ~$15K/radiologist/year
        - ROI >300% costs of CSR platforms
    - Market prevalence:
      - 1996: <1%
      - 2013: >60%

Integra Imaging

INTRODUCTION: The "Bad"

- Compared to use of medical transcriptionists (MT)
  - Transcription errors: 10-50% of reports
  - Radiologists' productivity:
    - Most reports: ↓ 10-40%
    - Exceptions: No change - ↑ 5%
  - Substantial differences in implementation
    - Planning
    - Training
    - Assessments

Integra Imaging

INTRODUCTION: Our "Problem"

- Integra Imaging (IIPS) ~ 100 radiologists
  - Eastern (Inland Imaging) Division: ~ 60
    - Spokane: 16 sites; in-house teleradiology
    - Initial CSR implementation: 2006
      - Front end (Radiologists as editors): 2006
  - Western (Seattle Radiologists) Division: ~40
    - Seattle: 8 sites; in-house teleradiology
    - Initial CSR implementation: 2005
      - Front end: 2007
  - Integrated, comprehensive in-house IT services (Nuvodia)

Integra Imaging

INTRODUCTION: Our "Problem"

- Despite recipient enthusiasm, re: ↓ RTAT
  - ↑↑ number & acrimony of complaints, re: **"sloppy reports"**
  - Threatened loss of referrals, management contracts
- Radiologist push-back
  - "Transcription editing is not our job!"
  - Errors refractory to usual "Professionalism" ethos exhortations

Integra Imaging

INTRODUCTION: Intended Improvement

From: Project Overview Statement (3/1/2007)

- **Primary Project Objectives**
  - Develop scorecards for individual physicians that are educational, and assist in the overall increase in the quality of the reports.
  - Assist the lower quartile radiologists to move into the higher quartile by process improvement and continuous feedback.
  - Remain above 85% for at least 6 months and have the goal raised higher in the future.
- Executive Sponsors:
  - Chair, Quality Assurance Committee (QAC)
  - President, Eastern (Inland Imaging) Division
  - CEO, IIPS
  - Nuvodia CEO
- **Study Question**: Can CSR be "made" to perform at transcription accuracy level of MT (~97-98%) without loss of radiologists' job satisfaction & productivity?

Integra Imaging

METHODS: Ethical Issues

- ***Primum non nocere:***
  - Aware that some reports were & might remain confusing/misleading during improvement efforts
  - Aware that CSR ↑ perceived job stress for radiologists (new responsibilities, potential ↓ productivity, ↓ autonomy)
  - Aware that CSR had ↑ cost of poor quality (rework, service recovery)
- Mitigations
  - ↑ support staff (Radiologists' Assistants)
  - ↑ same & next day peer-reviews (early detection/correction)
  - "Just Culture": Educate; Coach; & (not required) Discipline

Integra Imaging

METHODS: Setting

- 24/7/365 across system
- Geographically dispersed: 24 sites
  - East - 16 sites: single integrated PACS-CSR
  - West - 8 sites: 3 different PACS-CSR
- Specialization: Subspecialty & modality
- Variable case-mix complexity
  - High co-morbidities: 5 Centers of Excellence
    - Longer reports
  - Low co-morbidities: Ambulatory care, Family Medicine Clinics, *etc.*

Integra Imaging

METHODS: Planning Intervention

From: Project Overview Statement (3/1/2007)

- **Milestone 1 (Plan)**
  - Literature review
  - Develop & standardize measurement tools
  - Creation of Individual report cards
  - Creation of over-all group report card
- **Milestone 2 (Do & Study)**
  - Measure
  - Root cause analysis of lower quartile radiologists
  - Develop & implement interventions
  - Repeat
- **Milestone 3 (Do)**
  - Consistency of above 85% error rate
  - Consistency of reporting to identify outliers and root cause of issues
  - Group & radiologist feedback, & dialog
  - Repeat until goal achieved
- **Anticipated Project Issues**
  - Roadblocks facing the project
  - Report Cards/scorecards not well received by radiologists
  - Reporting of data is cumbersome, time consuming and manual

Integra Imaging

METHODS: Choosing Interventions

- Systematic review-intervention cycles guided by data
- Potential error-specific interventions proposed by:
  - CSR vendor
  - Literature
  - In-house IT support
- Measurement tools include error classification linked to potential interventions
- Radiologists' productivity:
  - RVU/hour
- Referring provider satisfaction

Integra Imaging

METHODS: Initial Plans

- Project overseen by process improvement expert certificated in 6-Sigma & Lean
- Measurement (audit) tools
  - East (Inland Imaging) Division
    - Single QA Editor, a MT, performed all reviews & data entry for 30 randomly selected reports per month per radiologist
  - West (Seattle Radiologists) Division
    - Audits: Single QA Editor performed all reviews & data entry for 40 consecutive reports per quarter per radiologist
    - Usual part of "Physician-to-Physician Leaning" reviews (*aka* Peer-Review), 3-4% of all reports

Integra Imaging

METHODS: Initial Plans

- CSR System Design
  - Standardize Report Templates & Macros
    - ↑ Report completeness
    - ↓ Number of words dictated
    - Establish change management processes
  - Dictionary modifications
    - Modality (CT, IR, MR, Nucs, *etc.*)
    - Specialty (body parts)

Integra Imaging

METHODS: Initial Plans

- CSR Education
  - Feedback:
    - Report Cards (annual)
    - Addenda tabulations (monthly, annual summary)
  - Training
    - System use: microphone, CSR tools, *etc.*
    - Based on individual performance
      - Potential interventions by error class:

- Annunciation – Word & Phrase Training Individual User Basis
- Suffix – Word Training; Grammar Checker,
- Added Word – Phrase training; Grammar Checker
- Missing Word – Phrase training; Grammar Checker
- Homonym – Phrase Training; Human Intervention
- Spelling – Dictionary Management; Dragon Spell Checker or other Grammar Checker
- Unclassifiable based on Context – Human Intervention (Potential ly, Grammar Checker may pick up)

Integra Imaging

METHODS: Study Design

- Quasi-experimental longitudinal observational
  - Controls:
    - Historical: Baseline data
    - Usual care: Western (Seattle Radiologists) Division
- Outcomes:
  - Primary Outcome: % error-free reports
  - Secondary Outcomes: Radiologists' productivity
- Validity challenges:
  - Internal: Changes in group membership, CSR version
  - External: Changes in CSR vendor, corporate will

Integra Imaging

METHODS: Study Design

- Assessing intervention reproducibility
  - Independent 2nd review of subset of reports
  - Qualitative: Referring Provider Survey results

Integra Imaging

METHODS: Planned Analyses

- Drawing inferences:
  - Paredo charts
  - Trend lines
  - Effect size
    - Paired t-Test within across time; t-Test East-West
- Units of analyses
  - Group
  - Individual radiologists
- Anticipated variability
  - Inter- & intra-radiologist (literature)
  - Skewed data distributions (literature)

Integra Imaging

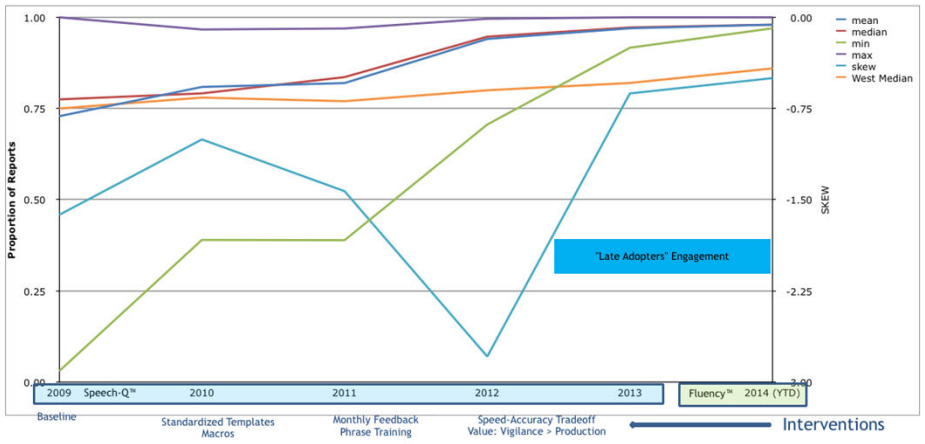
RESULTS: Setting

- Setting
  - Sustained Commitment to Success
    - Corporate leadership provided resources (attention, adequate personnel & budgets)
    - Communications structured & predictable (frequency, forums, vehicles, content)
    - Value Statement: Vigilance over Volume
  - Substantive efficiencies gained from managing a single integrated PACS-CSR architecture

Integra Imaging

RESULTS:

Radiologists Edited Voice Recognition Transcription Error-Free Reports
Eastern Division (Intervention) *vs.* Western Division (Control)



	2009	2010	2011	2012	2013	2014
# Reviewed	8500	9246	17886	17946	19699	16200

RESULTS: Productivity & Costs

	2009	2010	2011	2012	2013	2014
RTAT % <target time	93.0%	[89.9%]	93.35%	[90.0%]	84.75%	[94.6%]
RVU/hr	53.69	53.98	53.55	52.2	53.52	N/A
Referring Satisfaction	98.7	98.7	98.2	99.6	99.5	N/A
Costs/report	N/A	$0.04	$0.07	$0.08	$0.09	N/A

Process Changes in Delivery of Care

- Closer CSR-vendor partnership
  - ↑ in-house support & system design skills
- Improved workflow & environment for radiologists
  - ↑ technical sophistication in use of CSR
  - ↓ radiologists' interruptions, noise-reduction, & transcription errors
  - Maintenance of radiologists' productivity
    - RVUs
    - Completeness of reports
    - RTATs

Integra Imaging

RESULTS: Challenges remain

- "Mastering" CSR takes time (2-3 years)
  - Re:
    - Recidivism
    - Reminders
    - Re-education
    - Re-design
- CSR templates do not always match clinical questions
- Vigilance-Speed Trade-offs
  - Discounting future events favors speed now

Integra Imaging

RESULTS: Strength of Associations

	2009 *vs* 2010	2010 vs 2011	2011 vs 2012	2012 vs 2013	2009 vs 2013
East-East Paired t-Test	0.0027	0.00018	0.0001	0.7432	0.000001
West – West Paired t-Test	0.0903	0.1289	0.077979	0.1720	0.0092
East-West t-Test	0.3962	0.4128	0.0340	0.032332	0.0342

Missing Data for Interventions

- Radiologists <50% FTE not included
- Mammography not included (using BI-RADS)

Integra Imaging

DISCUSSION: Summary

- Structured, willful use of PDSA cycles (Eastern Division) resulted in sustained improvements in proportion of radiologists-edited CSR transcription error-free reports beyond that achieved by technology platform enhancements alone (Western Division)
- Radiologists-as-Editors did NOT result in decrement in either RTAT or radiologist productivity
- It's not free, but at 4-9¢/report – it's a steal!
  - Transforming the "costs of poor quality" (rework, service recovery, trademark dilution, loss of business) into "costs of quality" (*designed into system*)
  - Reinforces that the central role of radiologists is creating & maintaining quality in the eyes of internal & external healthcare partners
- Essential ability to control or strongly influence IT platform integration, implementation, support, education & outreach

Integra Imaging

DISCUSSION: Relative to others, we …

- Sustained & followed interventions over 5+ years (*vs.* ≤ 2 years)
- Assessed intervention effectiveness from multiple perspectives (*vs.* 1-2 perspectives)
  - Error-free report %
  - RTAT
  - Radiologists' productivity
  - Client satisfaction
- Used both historical & concurrent external "usual care" control (*natural experiment*)
- Assessed "generalizability" of intervention across different CSR platforms (*vs.* differences in speech recognition between CSR programs)

Integra Imaging

DISCUSSION:
Limitations to study & 'generalizability'

- Report reviews did not assess "action-ability" (clarity, completeness, accuracy)
- Did not review **all** reports or **all** radiologists (eg, <50% FTE excluded)
- Assessment of inter- & intra-reader variability in reviewing & classifying reports does not meet usual statistical standards
- Difficult to separate independent effects of CSR version or vendor change from experience-based user learning
- Relative to Integra Imaging, not all radiology groups
  - Have the influence over IT platforms & resources
  - Have a culture supportive of process improvement efforts for often ill-defined ("soft") future benefits
    - Many physician groups' cultures assume that "professionalism" (individual-centered responsibility) will solve nearly all quality issues
- "There's always water in the bilge…":
  - On-going education & coaching warranted: Human tendency to "normalize" sub-disruptive behavior that provides current gain over future pain
  - Transition to less intense & costly monitoring program (high-water alarm)

Integra Imaging

DISCUSSION: Interpretation

- Structured approach 1st assuming that editing errors reflect *system* opportunities
  - System CSR interventions
    - Templates & macros
    - Dictionary management by modality & specialty
  - Radiologist CSR interventions
    - Delay speaking for ~ 0.5 seconds after press "dictate" buttons/pedals
    - Correct (train) errors immediately
    - Report template & punctuation errors to management for evaluation
    - Phrase training works best if ≥ 3-word sequences are trained
      - Annunciation, including speech pathology (eg, lisps)
      - Suffixes
      - Missing words (especially pronouns)
    - CSR technology requires 2-3 years of careful attention for radiologist to master
    - Vigilance > Speed: "Good radiologist do not sign bad reports!"
- It took longer & more effort than anticipated!

Integra Imaging

DISCUSSION: Can you do this?

- Yes, if:
  - Performance is preferred, measured & managed (ie, Defect-free RVUs: accessible, appropriate, compassionate, safe, timely, accurate, equitable, valuable)
  - Willing to invest in transforming **"costs of poor quality"** uncovered late or after service delivery into **"costs of quality"** built into system design & in-process inspections

Integra Imaging

CONCLUSION

- At a radiology diagnostic report level, low-cost interventions can attain editing error-free performance comparable to that of medical transcriptionists (≥97%)
- Many radiology practices would benefit from redefining their sense of "good" to adjust for the considerable costs of poor quality

Integra Imaging

Evidence Table

	Authors	Title	Journal/Text
1	Al-Aynati MM1, Chorneyko KA.	Comparison of voice-automated transcription and human transcription in generating pathology reports.	Arch Pathol Lab Med. 2003 Jun;127(6):721-5.
2	Antiles S1, Couris J, Schweitzer A, Rosenthal D, Da Silva RQ.	Project planning, training, measurement and sustainment: the successful implementation of voice recognition.	Radiol Manage. 2000 Jan-Feb;22(1):18-31
3	Basma S1, Lord B, Jacks LM, Rizk M, Scaranelo AM.	Error rates in breast imaging reports: comparison of automatic speech recognition and dictation transcription.	AJR Am J Roentgenol. 2011 Oct;197(4):923-7
4	Bergeron BP.	Voice recognition in clinical medicine: process versus technology.	J Med Pract Manage. 2001 Jan-Feb;16(4):213-5.
5	Bhan SN1, Coblentz CL, Norman GR, Ali SH.	Effect of voice recognition on radiologist reporting time.	Can Assoc Radiol J. 2008 Oct;59(4):203-9.
6	Boland GW1, Guimaraes AS, Mueller PR	Radiology report turnaround: expectations and solutions.	Eur Radiol. 2008 Jul;18(7):1326-8
7	Cavagna E1, Berletti R, Schiavon F, Scarsi B, Barbato G.	Optimized delivery radiological reports: applying Six Sigma methodology to a radiology department.	Radiol Med. 2003 Mar;105(3):205-1
8	Chang CA1, Strahan R, Jolley D.	Non-clinical errors using voice recognition dictation software for radiology reports: a retrospective audit.	J Digit Imaging. 2011 Aug;24(4):724-8
9	Cowan IA1, MacDonald SL, Floyd RA.	Measuring and managing radiologist workload: measuring radiologist reporting times using data from a Radiology Information System.	J Med Imaging Radiat Oncol. 2013 Oct;57(5):558-66
10	Devine EG1, Gaehde SA, Curtis AC.	Comparative evaluation of three continuous speech recognition software packages in the generation of medical reports.	J Am Med Inform Assoc. 2000 Sep-Oct;7(5):462-8.
11	Gale B1, Safriel Y, Lukban A, Kalowitz J, Fleischer J, Gordon D.	Radiology report production times: voice recognition vs. transcription.	Radiol Manage. 2001 Mar-Apr;23(2):18-22
12	Hart JL1, McBride A, Blunt D, Gishen P, Strickland N.	Immediate and sustained benefits of a "total" implementation of speech recognition reporting.	Br J Radiol. 2010 May;83(989):424-7
13	Hawkins CM1, Hall S, Hardin J, Salisbury S, Towbin AJ.	Prepopulated radiology report templates: a prospective analysis of error rate and turnaround time.	J Digit Imaging. 2012 Aug;25(4):504-11
14	Hayt DB1, Alexander S.	The pros and cons of implementing PACS and speech recognition systems.	J Digit Imaging. 2001 Sep;14(3):149-57.
15	Ichikawa T[1], Kitanosono T, Koizumi J, Ogushi Y, Tanaka O, Endo J, Hashimoto T, Kawada S, Saito M, Kobayashi M, Imai Y.	Radiological reporting that combine continuous speech recognition with error correction by transcriptionists.	Tokai J Exp Clin Med. 2007 Dec 20;32(4):144-7.
16	Joshi V1, Narra VR, Joshi K, Lee K, Melson D.	PACS administrators' and radiologists' perspective on the importance of features for PACS selection.	J Digit Imaging. 2014 Aug;27(4):486-95
17	Kauppinen T1, Koivikko MP, Ahovuo J.	Improvement of report workflow and productivity using speech recognition--a follow-up study.	J Digit Imaging. 2008 Dec;21(4):378-82
18	Kauppinen TA1, Kaipio J, Koivikko MP.	Learning curve of speech recognition.	J Digit Imaging. 2013 Dec;26(6):1020-4
19	Krishnaraj A1, Lee JK, Laws SA, Crawford TJ.	Voice recognition software: effect on radiology report turnaround time at an academic medical center.	Voice recognition software: effect on radiology report turnaround time at an academic medical center.

Integra Imaging

Evidence Table

20	Laflamme MR1, Dexter PR, Graham MF, Hui SL, McDonald CJ.	Efficiency, comprehensiveness and cost-effectiveness when comparing dictation and electronic templates for operative reports.	AMIA Annu Symp Proc. 2005:425-9
21	Langer S.	Radiology speech recognition: workflow, integration, and productivity issues.	Curr Probl Diagn Radiol. 2002 May-Jun;31(3):95-104.
22	Luetmer MT1, Hunt CH, McDonald RJ, Bartholmai BJ, Kallmes DF.	Laterality errors in radiology reports generated with and without voice recognition software: frequency and clinical significance.	J Am Coll Radiol. 2013 Jul;10(7):538-43
23	McGurk S1, Brauer K, Macfarlane TV, Duncan KA.	The effect of voice recognition software on comparative error rates in radiology reports.	Br J Radiol. 2008 Oct;81(970):767-70.
24	McGurk S1, Brauer K, Macfarlane TV, Duncan KA.	The effect of voice recognition software on comparative error rates in radiology reports.	Br J Radiol. 2008 Oct;81(970):767-70
25	Mohr DN[1], Turner DW, Pond GR, Kamath JS, De Vos CB, Carpenter PC.	Speech recognition as a transcription aid: a randomized comparison with standard transcription.	J Am Med Inform Assoc. 2003 Jan-Feb;10(1):85-93
26	Paulett JM1, Langlotz CP.	Improving language models for radiology speech recognition.	J Biomed Inform. 2009 Feb;42(1):53-8.
27	Paulett JM1, Langlotz CP.		J Biomed Inform. 2009 Feb;42(1):53-8
28	Pezzullo JA1, Tung GA, Rogg JM, Davis LM, Brody JM, Mayo-Smith WW.	Voice recognition dictation: radiologist as transcriptionist.	J Digit Imaging. 2008 Dec;21(4):384-9
29	Quint LE1, Quint DJ, Myles JD.	Frequency and spectrum of errors in final radiology reports generated with automatic speech recognition technology.	J Am Coll Radiol. 2008 Dec;5(12):1196-9
30	Rana DS1, Hurst G, Shepstone L, Pilling J, Cockburn J, Crawford M.	Voice recognition for radiology reporting: is it good enough?	Clin Radiol. 2005 Nov;60(11):1205-12
31	Sferrella SM.	Success with voice recognition.	Radiol Manage. 2003 May-Jun;25(3):42-9.
32	Strahan RH1, Schneider-Kolsky ME.	Voice recognition versus transcriptionist: error rates and productivity in MRI reporting.	J Med Imaging Radiat Oncol. 2010 Oct;54(5):411-4
33	Takahara T1, Nakajima M, Nitatori T, Hachiya J.	[Japanese radiological report creation with continuous speech recognition].	Nihon Igaku Hoshasen Gakkai Zasshi. 2002 Jan;62(1):23-6.
34	Trumm CG1, Glaser C, Paasche V, Crispin A, Popp P, Küttner B, Francke M, Nissen-Meyer S, Reiser M.	[Impact of a PACS/RIS-integrated speech recognition system on radiology reporting time and report availability].	Rofo. 2006 Apr;178(4):400-9
35	Wheeler S1, Cassimus GC.	Selecting and implementing a voice recognition system.	Radiol Manage. 1999 Jul-Aug;21(4):37-42
36	Williams DR1, Kori SK, Williams B, Sackrison SJ, Kowalski HM, McLaughlin MG, Kuszyk BS.	Voice recognition dictation: analysis of report volume and use of the send-to-editor function.	Voice recognition dictation: analysis of report volume and use of the send-to-editor function.
37	Zafar A1, Mamlin B, Perkins S, Belsito AM, Overhage JM, McDonald CJ.	A simple error classification system for understanding sources of error in automatic speech recognition and human transcription.	Int J Med Inform. 2004 Sep;73(9-10):719-30.
38	Zafar A1, Overhage JM, McDonald CJ	Continuous speech recognition for clinicians.	J Am Med Inform Assoc. 1999 May-Jun;6(3):195-204.

Integra Imaging

1. RQRP - Radiologist Quality Reports Portal

2. RQRP - Radiologist Quality Reports Portal Logout

Home | Addend | Quality | Admin |

Home > Quality > Quality Periods > Quality Period Error Summary

3.

PROCEDURE: MRI Ankle Left without Contrast

CLINICAL INDICATIONS: No precious surgery. Increased pain with weight bearing. Pain In Joint Involving Ankle And Foot Concern reportedly for OCD lesion.

4. exam of the ankle without contrast.

(0) NO ERROR
(1) Annunciation
(2) Dictionary absence
(3) Suffix
(4) Added words
(5) Missing words
(6) Homonyms
(7) Spelling
(8) Unclassifiable based on context
[9] Critical errors, in which reader might confuse meaning of report [since any of the above can be this and one of the above.]

eased relative T2 signal intensity in the medial talus. No fracture line is apparent

5.

Physician	Reports Reviewed	# Lines	CS Errors	GS Errors	SR Errors	BL Errors	% Errors/ Line	Reports With Error	Correct Reports	% Correct
[redacted]	30	2266	0	0	0	0	0.00%	0	30	100.00%
	28	1751	0	1	0	0	0.06%	1	27	96.43%
	30	2089	0	0	0	0	0.00%	0	30	100.00%
	30	2716	0	3	0	0	0.11%	3	27	90.00%

6.

Dept: IIAPS Radiology

Report Audit Statistics All Sites 2014

Report Audit Goal = 90 per Radiologist

	1st QUARTER	2ND QUARTER	3RD QUARTER	4TH QUARTER	YTD
Total Reports Completed	176,996	-	-	-	176,996
Report Audits Completed	4,669				4669
% Report Audits Achieved	2.64%	#DIV/0!	#DIV/0!	#DIV/0!	2.64%
# of Error Free Reports	4,545				4545
% Error Free Reports	97.34%	#DIV/0!	#DIV/0!	#DIV/0!	97.34%

All Sites

RQRP Error Summary

	Rpts Reviewed	Correct Rpts	% Error Free Rpts
1/14	1,607	1,571	97.76%
2/14	1,585	1,548	97.67%
3/14	1,477	1,426	96.55%
	4,669	4,545	97.34%

Integra Imaging

BACK TO PRESENTATION

1. Reports reviewed

FINDINGS:
The paranasal sinuses are well developed and pneumatized. There is a 11 x 9 mm polyp or retention cyst in the alveolar recess of the left axillary sinus. There is minimal inflammatory mucosal thickening in select bilateral ethmoid air cells and along the medial margin of the right maxillary sinus. No significant mucosal disease in the frontal and sphenoid sinuses. No air-fluid levels are present to suggest acute sinusitis.
POSTERIOR DRAINAGE PATHWAYS:
No bony or mucosal abnormality seen at the level of the sphenoethmoidal recesses.
ANTERIOR DRAINAGE PATHWAYS:
Right osteomeatal unit: Pneumatization of the orbit of the ethmoid results in mild narrowing of the infant the channel. There is no evidence for encroachment of the middle meatal airspace. .
Left osteomeatal unit: Normal appearance is noted of the sinus ostium, infundibulum and hiatus semilunaris . There is no evidence for encroachment of the middle meatal airspace.
NASAL CAVITY: Nasal septum is midline. No nasal masses identified. Bones adjacent to the paranasal sinuses including the lamina papyracea and cribriform plates are intact. The fovea ethmoidalis is symmetric in appearance.
There are moderate sized bilaterally agar nasi cells however no evidence of encroachment of the nasofrontal recesses. I
MPRESSION:
11 mm polyp or retention cyst alveolar recess left maxillary sinus. No air-fluid levels to indicate acute sinusitis. No evidence of obstruction of the anterior or posterior drainage pathways..

2. Data entered into Excel™ (Microsoft Corp., Redmond, WA)

Date	Accession #	Site	Radiologist	Modality	Error phrase	Location	Classification	Confusing?	Comments
08/07/14	644905	NT	Mann	CT	appreciated..		(7) Spelling	No	
08/07/14	644905	NT	Mann	CT	, and as a 4 x 4 mm bony bar		(4) Added words	No	as
08/05/14	645056	NT	Mann	MR			(3) Suffix	No	
08/05/14	645056	NT	Mann	MR	This lack of change between the examinations suggest this is fixed in location consistent with multiplanar tearing of that is particularly prominent anteriorly		(4) Added words	No	of
08/07/14	645540	NT	Mann	CT	(No Error)		(0) NO ERROR	No	
08/05/14	645814	NT	Mann	MR	(No Error)		(0) NO ERROR	No	
08/07/14	645882	NT	Mann	MR	Other Complications Due To Internal Joint Prosthesis		(7) Spelling	No	
08/08/14	645882	NT	Mann	MR	No osteolysis or preprostatic subsidence.		(1) Annunciation	No	
08/05/14	645894	NT	Mann	MR	Current Tear Of Lateral Cartilage Or Meniscus Of Knee		(7) Spelling	No	
08/06/14	645894	NT	Mann	MR	A nondisplaced tibial plateau fracture (series 1, images 3 and 8; series 3, image 13; series 4, image 24) anteriorly with surrounding edema.		(5) Missing words	No	Missing: "is present"
08/05/14	645903	NT	Mann	XR	(No Error)		(0) NO ERROR	No	
08/05/14	645906	NT	Mann	XR			(4) Added words	No	
08/07/14	645911	NT	Mann	CT			(4) Added words	No	and
08/07/14	645911	NT	Mann	CT	(series 200, and image 24; series 4, image 62) normally aligned and show minimal degenerative change.		(3) Suffix	No	shows

Integra Imaging

CONTINUED

3. Pivot table shows transcription error type by radiologist

Count of Classification	Classification								
Radiologist	(0) NO ERROR	(1) Annunciation	(3) Suffix	(4) Added words	(5) Missing words	(6) Homonyms	(7) Spelling	(8) Unclassifiable based on context	Grand Total
[redacted]	14	32	7	8	23	2	10		96
	14	19	12	14	17	3	16	2	97
	3	11	4	55	48	2	14	6	143
	12	12	4	33	29		19	2	111
Grand Total	43	74	27	110	117	7	59	10	447

4. Pivot table shows transcription error type for group

Count of Accession #	Modality				
Classification	CT	MR	US	XR	Grand Total
(0) NO ERROR	13	9	1	20	43
(1) Annunciation	21	37	1	15	74
(3) Suffix	8	16		3	27
(4) Added words	48	46	6	10	110
(5) Missing words	29	69	3	16	117
(6) Homonyms	2	3		2	7
(7) Spelling	21	29	3	6	59
(8) Unclassifiable based on context	7	3			10
Grand Total	149	212	14	72	447

Integra Imaging

BACK TO PRESENTATION